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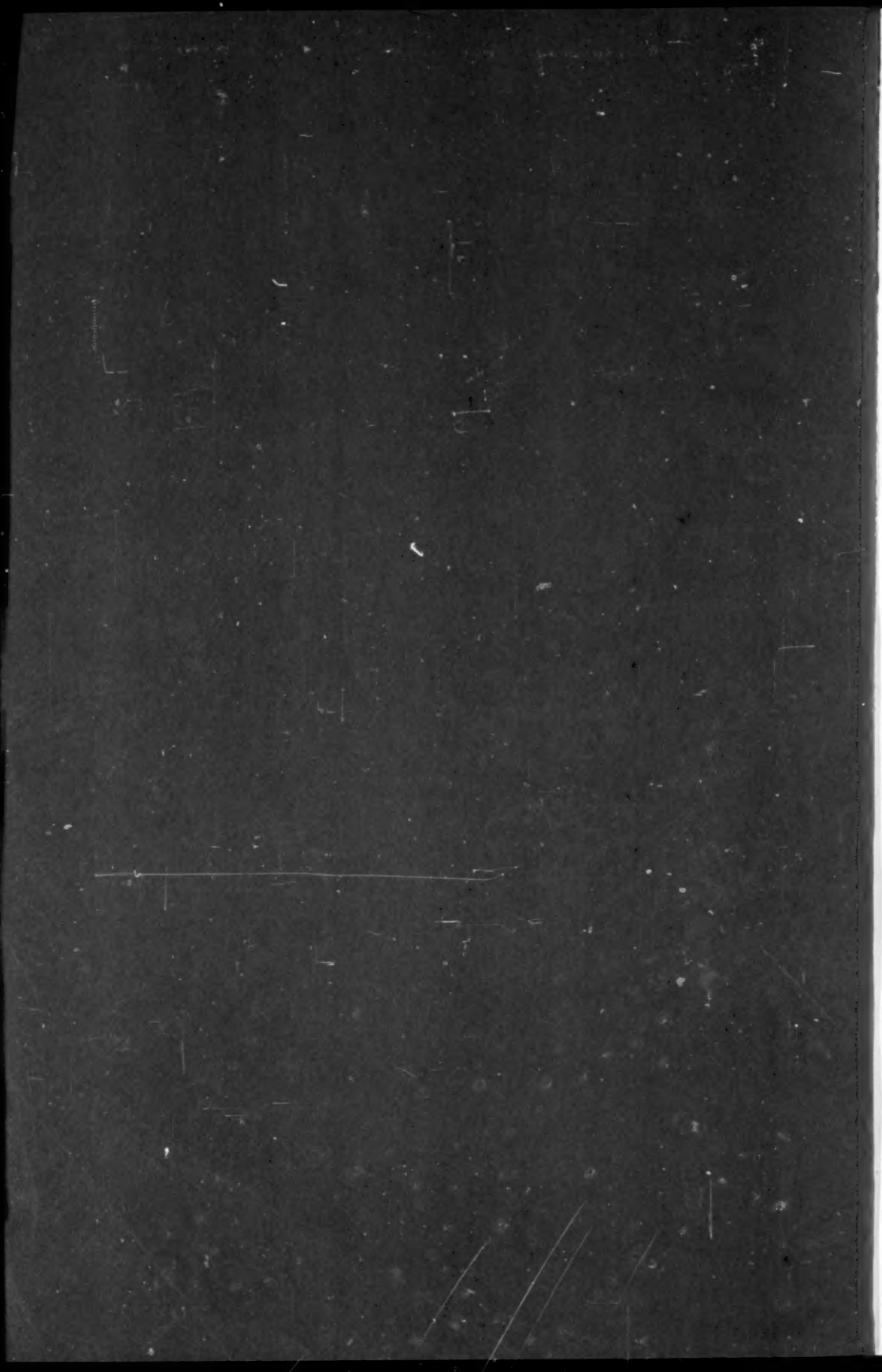

OFFICIAL GAZETTE of the UNITED STATES PATENT and TRADEMARK OFFICE

March 1, 1977 Volume 956 Number 1

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PATENT AND TRADEMARK OFFICE NOTICES

Results of Trial Voluntary Protest Programs

This notice updates the results of the First Trial Voluntary Protest Program and summarizes the preliminary results of the Second Trial Voluntary Protest Program.

First Trial Voluntary Protest Program

The First Trial Voluntary Protest Program was announced in the Commissioner's Notice of May 7, 1974, which appeared in the OFFICIAL GAZETTE on June 4, 1974 at 923 O.G. 2. The preliminary results of the program were summarized in the Commissioner's Notice of September 4, 1975, which appeared in the OFFICIAL GAZETTE on October 7, 1975 at 939 O.G. 1.

In the First Trial Voluntary Protest Program, 667 applications were published for protest. Sixty-seven protests were received in sixty applications. Prosecution was reopened in 37 of the protested applications.

The current status of the 667 published applications is shown in Table I.

TABLE I.—STATUS OF PUBLISHED APPLICATIONS

[December 31, 1976]

Status	Published applications—			
		Protested—		
	Not protested	Not reopened	Reopened	Total
Patent issued	586	23	11	620
Allowed, awaiting issue	1	0	8	9
Pending	0	0	10	10
Abandoned	20	0	8	28
Totals	607	23	37	667

The issues or grounds for non-patentability raised in the Office actions reopening prosecution in the 37 applications reopened for prosecution are tabulated in Table II. The number shown indicates the number of applications in which the indicated issue was raised. It will be noted that more than one issue was raised in some applications.

TABLE II.—ISSUES RAISED IN REOPENING ACTIONS

Issue raised	Number of applications now—			
	Abandoned	Allowed	Pending	Total
1. Prior art under 35 USC 102	3	7	5	15
2. Prior art under 35 USC 103	8	16	4	28
3. Prior public use or sale under 35 USC 102(b)	0	0	1	1
4. Prior invention under 35 USC 102(g)	0	0	2	2
5. 35 USC 112, first paragraph	0	1	1	2
6. 35 USC 112, second paragraph	0	4	3	7
7. Misrepresentation or fraud	0	0	1	1

The status of claims appearing in the 27 applications in which prosecution was reopened and concluded is shown in Table III.

TABLE III.—STATUS OF CLAIMS

	Number of claims		
	In applications—		
	Allowed	Abandoned	Total
1. Published for protest	142	89	231
2. Rejected in Office action reopening prosecution	130	89	219
3. Ultimately allowed	143	0	143

The applications in which prosecution has not been concluded contained 96 allowed claims of which 62 were rejected in the Office action reopening prosecution.

In 32 of the 37 protested applications in which prosecution was reopened, at least one claim was rejected on prior art under 35 USC 102 or 35 USC 103. The type of prior art utilized in these rejections is shown in Table IV. The number shown indicates the number of applications in which the indicated art was utilized.

TABLE IV.—PRIOR ART RELIED UPON IN REJECTING CLAIMS

Type of art	Number of applications now—			
	Allowed	Abandoned	Pending	Total
U.S. patents—				
Of record	10	6	2	18
Newly cited by protester	10	4	3	17
Newly cited by examiner	3	0	2	5
Foreign patents—				
Of record	2	1	0	3
Newly cited by protester	8	1	1	10
Newly cited by examiner	1	0	0	1
Non-patent literature—				
Of record	2	0	0	2
Newly cited by protester	7	2	0	9
Newly cited by examiner	1	0	0	1

A rejection of at least one claim was made in 33 of the 37 applications in which prosecution was reopened. Of the remaining four, 2 have been placed in interference proceedings, 1 is undergoing public use proceedings and in 1 an allegation of fraud is under investigation. The number of claims rejected, the grounds for the rejections and whether the rejections were based upon information furnished by the protester, the examiner or a combination of information furnished by the protester and the examiner is shown in Table V. The number in parentheses indicates claims rejected in applications which have been issued or allowed.

TABLE V.—GROUNDS FOR REJECTION OF PUBLISHED CLAIMS

Information furnished by	Number of claims rejected			
	On prior art under—		Under 35 USC 112—	
	35 USC 102	35 USC 103	First para.	Second para.
Protester	151(57)	150(33)	18(10)	10 (2)
Examiner	9(1)	9(9)	0	12 (8)
Combination	0	80(73)	0	0
Totals	160(58)	239(115)	18(10)	22(10)

The rejection of claims in those applications now issued or allowed were overcome or the claims cancelled to place the applications in condition for allowance. The number of claims, the ground for rejection and the manner in which the rejection was overcome is shown in Table VI.

TABLE VI.—REJECTIONS OVERCOME

Rejection overcome by	Number of claims rejected			
	On prior art under—		Under 35 USC 112—	
	35 USC 102	35 USC 103	First para.	Second para.
Argument only	0	0	10	1
Amendment	52	94	0	8
Affidavit or declaration under 37 CFR 1.131	4	6	0	0
Affidavit or declaration under 37 CFR 1.132	0	6	0	0
Cancelled claims	2	0	0	1

Second Trial Voluntary Protest Program

The Second Trial Voluntary Protest Program was announced in the Commissioner's Notice of September 16, 1975, which appeared in the OFFICIAL GAZETTE on September 16, 1975 at 938 O.G. 945.

Under the Program, a number of applicants were given an opportunity to waive confidentiality of their allowed applications in order to allow publication and public inspection thereof prior to issuance of a patent.

A request for a waiver of confidentiality was mailed in 4,747 applications together with the Notices of Allowance mailed during a three week period in October, 1975. Waivers of confidentiality were received for 1,303 applications within the three-month period permitted. Filing of the waiver of confidentiality served to vacate the Notice of Allowance. The 1,303 applications were published and at least one claim and a drawing figure, if any, from each was published in the OFFICIAL GAZETTE. Publication of the applications commenced on January 20, 1976 and was completed on April 20, 1976.

The period for submitting protests was three months in length running from the date of publication. During the protest period, 71 protests were filed in 68 applications.

The evidence against allowability of claims submitted in the 68 applications was considered by the appropriate examiners and group directors. The group directors determined that prosecution should be reopened in 43 applications. No prima facie showing of non-patentability was deemed made in the protests to 25 applications, and consequently, the prosecution was not reopened in these applications.

These statistics are shown, by examining group, in Table VII.

TABLE VII. APPLICATIONS IN PROGRAM

	Number of waivers requested	Number of waivers received	Percent participation	Number protested	Number reopened	Number not reopened
Examining Group:						
110	344	104	30	11	8	3
120	476	216	45	11	6	5
140	280	133	48	14	7	7
160	215	65	30	4	4	0
170	239	75	31	9	4	5
210	348	85	24	3	2	1
220	121	45	37	1	1	0
230	314	97	31	0	0	0
240	366	67	18	5	4	1
250	326	103	32	0	0	0
290	308	33	11	0	0	0
310	361	78	22	5	3	2
320	261	43	16	1	1	0
330	249	36	14	1	1	0
340	293	83	28	1	1	0
350	246	40	16	2	1	1
Totals	4,747	1,303	27	68	43	25

The following data were tabulated about the 1,303 published patent applications:

1. 5.2 percent of the applications published were protested.
2. 305 requests for access to the published applications were made during the protest period.
3. Approximately 200 requests for copies of the file wrapper contents of the published applications were made during the protest period.
4. 9.9 percent of the published applications were divisional applications.
5. 9.1 percent of the published applications were continuation-in-part applications.
6. 6.8 percent of the published applications were continuations.

The following data show the origin and ownership of the published applications as compared to the patents issued in 1975.

	Percent	
	Published applications	Patents issued in 1975
1. Assigned	80.2	73
2. No assignment indicated	7.4	24
3. Assigned to U.S. Government	3.4	3
4. Foreign origin	31.9	35

Statistics concerning the ownership, origin and type of application are shown, by examining group, in Table VIII.

TABLE VIII.—PUBLISHED APPLICATION DATA

		Application ownership				Type of application			
	Number published	Assigned	Government	Unassigned	Foreign origin	Cont.	Cont.-in-part	Division	Reissue
Examining group:									
110	104	93	5	6	35	8	12	10	0
120	216	207	2	7	78	23	38	47	0
140	133	129	1	3	57	14	18	18	0
160	65	60	2	3	22	4	8	9	0
170	75	65	1	9	23	3	11	9	0
210	85	75	3	7	20	6	2	2	0
220	45	32	12	1	12	1	6	1	1
230	97	91	1	5	33	9	3	5	1
240	67	55	2	10	28	3	5	1	0
250	103	91	8	4	31	6	2	3	0
290 (designs)	33	26	0	7	3	1	1	0	0
310	78	65	3	10	25	4	4	7	0
320	43	30	C	4	10	3	1	7	0
330	36	30	0	6	13	2	4	3	0
340	83	72	3	8	21	1	5	3	0
350	40	33	1	6	11	0	1	4	1
Corps	1,303	1,163	44	96	416	88	118	129	3

As indicated above, 71 protests were received in the 68 protested applications. Three applications attracted two protests each. The 43 applications in which prosecution has been reopened constitute 63 percent of the applications in which protests were received.

The issues or grounds for non-patentability raised in the 71 protests filed are tabulated in Table IX. The number shown indicates the number of protests which involved the indicated issue. It will be noted that some protests involved more than one issue.

TABLE IX.—ISSUES INVOLVED IN PROTESTS

	Number of protests		
	In applications—		
Issues involved	Reopened	Not reopened	Total
1. Prior art under 35 USC 102	17	5	22
2. Prior art under 35 USC 103	39	21	60
3. Prior public use or sale under 35 USC 102(b)	2	0	2
4. Prior invention under 35 USC 102(g)	5	2	7
5. 35 USC 112, first paragraph	4	1	5
6. 35 USC 112, second paragraph	6	1	7

Most of the protests filed included the citation of at least one prior art reference. A few protests were based upon prior art already of record in the applications. Others were based upon newly cited references, and some were based upon a combination of prior art of record with newly cited references. The number of protesters relying upon prior art and the type of references relied upon is shown in Table X.

TABLE X.—PRIOR ART CITED IN PROTESTS

Type of prior art	Number of protests		
	In applications—		
	Reopened	Not reopened	Total
None	4	4	8
Prior art of record only	1	1	2
Prior art newly cited only	30	12	42
Combined art of record and newly cited	11	8	19
U.S. patents	30	14	44
Foreign patents	14	3	17
Non-patent literature	19	12	31

The number of prior art citations, by type, submitted by the 46 protesters in the 43 applications which were reopened for prosecution is shown in Table XI.

TABLE XI.—PRIOR ART CITATIONS MADE IN APPLICATIONS REOPENED FOR PROSECUTION

Type of prior art	Number of protests	×	Number of citations	=	Total
U.S. patents	11		1		11
	6		2		12
	6		3		18
	2		4		8
	1		6		6
	1		7		7
	1		8		8
	1		12		12
	1		22		22
	1		26		26
	30		Cited		130
Foreign patents	8		1		8
	4		2		8
	2		7		14
	14		Cited		30
Non-patent literature	12		1		12
	5		2		10
	1		4		4
	1		5		5
	19		Cited		31

The number of prior art citations, by type, submitted by the 25 protesters in the 25 applications which were not reopened for prosecution is shown in Table XII.

TABLE XII.—PRIOR ART CITATIONS MADE IN APPLICATIONS NOT REOPENED FOR PROSECUTION

Type of prior art	Number of protests	×	Number of citations	=	Total
U.S. patents	6		1		6
	2		2		4
	1		3		3
	1		4		4
	1		5		5
	1		7		7
	1		10		10
	1		13		13
	14		Cited		52
Foreign patents	2		1		2
	1		3		3
	3		Cited		5
Non-patent literature	5		1		5
	2		2		4
	2		3		6
	2		4		8
	1		5		5
	12		Cited		28

The type of applications in which protests were filed is shown in Table XIII.

TABLE XIII.—TYPE OF APPLICATIONS IN WHICH PROTESTS WERE FILED

Type	Reopened		Not reopened		Total	
	Number protested	Percent	Number protested	Percent	Number protested	Percent
Foreign origin	11	26	9	36	20	29
Original	27	63	20	80	47	69
Continuation	2	5	2	8	4	6
Continuation-in-part	8	18	2	8	10	15
Divisional	6	14	1	4	7	10

Of the 1,235 published applications which were not protested, 876 had issued as patents on or before December 28, 1976. Nine of the protested applications had issued as patents. One application in which no protest was filed has been reopened for prosecution by the examiner as a result of prior art submitted in a protest to another application.

Conclusion

The Trial Voluntary Protest Programs have provided valuable experience relating to the administration of opposition or protest proceedings for allowed applications. The Programs have shown the potential of protest processings for bringing to the attention of the Patent and Trademark Office prior art and other information relevant to the patentability of a patent application which otherwise might not be considered.

Based upon available data it is estimated that the publication of allowed applications for protest prior to issuance and the processing of protests received adds at least $100 to the cost of processing each published application. About two-thirds of this cost is incurred in printing the applications.

In addition, the issuance of the published applications which were not protested was delayed by six to eight months. Protested applications were further delayed for varying periods. It is estimated that if a protest program similar to the trial programs, but applying to all applications, i.e., on a mandatory basis, were in effect, average pendency to issue would be increased by seven to eight months at an overall cost increase to the Office of about $7 million per year. It could be expected that this would result in the ultimate rejection or abandonment of about 3 percent of the applications which would otherwise have issued.

The voluntary participation of patent applicants by waiving confidentiality to permit publication of their applications prior to issue has been quite low—only 1,970 or 29.2 percent of the 6,745 given the opportunity elected to participate.

The degree of participation by the public has also been quite low—a total of 138 protests were filed in 128 or 6.5 percent of the 1,970 applications published.

Participation by both applicants and the public was less in the second trial than in the first. Of the applicants invited to participate, only 27 percent did so in the second trial while 33 percent elected to participate in the first trial. Protests were filed in 5.2 percent of the applications published in the second trial while 9.0 percent of the applications published in the first trial were protested.

If the trial program were continued on a regular, voluntary basis, the expectation would be that average pendency of all issued patents would increase about two months at a cost to the Office of about $1.75 million per year and that less than 1 percent of the patents which would otherwise issue would become abandoned.

If the law were such that the same protest procedures were available for three months after instead of before issue, all additional printing costs and delays in issue would be avoided. Assuming the same proportion of successful protests, the procedure would be expected to result in elimination of about 3 percent of the issued patents. Added cost to the Office would be about $2 million per year. Longer protest periods might be expected to bring forth somewhat more protests.

While these two trials have demonstrated the potential of protest proceedings for having prior art and other information brought to the attention of the Office and thus to avoid the issuance of undeserving patents, it is not planned to repeat the trial program or establish a permanent program for the voluntary publication of allowed applications for protest purposes. It is at least tentatively concluded that use of the same resources in improving the search file and search systems will be more cost-effective in raising the quality of issued patents.

A final evaluation and report on the Trial Voluntary Protest Programs is scheduled for completion in September 1977. We will welcome your comments and opinions on these programs. In the meantime the Office will begin to develop experience under a different procedure for bringing forth prior art applicable to issued patents, that afforded by the reexamination via reissue and the protest procedures contained in the recently revised rules, 37 CFR 1.11, 1.175, 1.176 and 1,291.

C. MARSHALL DANN,
Commissioner of Patents and Trademarks.

Dated: Jan. 21, 1977.

Board of Appeals Decisions Rendered in the Month of January 1977

Examiner affirmed	245
Examiner affirmed in part	34
Examiner reversed	67
Total	346

PATENT NOTICES

Certificates of Correction for the Week of Mar. 1, 1977

Re. 28,926	3,966,798	3,985,524	3,993,855
D. 241,267	3,966,896	3,985,532	3,993,856
D. 241,898	3,967,861	3,985,533	3,994,147
D. 242,319	3,968,032	3,985,534	3,994,169
D. 242,537	3,968,098	3,985,777	3,994,224
3,616,716	3,969,352	3,985,858	3,994,337
3,640,074	3,970,077	3,986,001	3,994,806
3,717,648	3,970,832	3,986,072	3,994,870
3,725,311	3,972,591	3,986,247	3,994,957
3,751,919	3,973,014	3,986,517	3,995,493
3,780,618	3,973,790	3,986,594	3,995,669
3,794,872	3,973,956	3,986,638	3,995,900
3,798,290	3,973,983	3,986,850	3,995,956
3,814,764	3,974,041	3,987,436	3,996,162
3,864,246	3,975,375	3,988,314	3,996,329
3,882,304	3,975,499	3,988,380	3,996,485
3,906,114	3,975,585	3,989,010	3,996,875
3,910,074	3,975,909	3,989,505	3,996,940
3,910,979	3,976,148	3,989,895	3,996,992
3,913,464	3,976,599	3,990,013	3,997,078
3,915,423	3,976,661	3,990,193	3,997,088
3,922,298	3,976,816	3,990,271	3,997,134
3,923,861	3,976,997	3,990,509	3,997,135
3,927,817	3,977,106	3,990,560	3,997,244
3,931,360	3,977,886	3,990,605	3,997,680
3,931,678	3,977,958	3,990,653	3,997,683
3,939,720	3,978,486	3,990,790	3,997,765
3,943,348	3,978,640	3,990,869	3,997,775
3,943,853	3,978,944	3,990,926	3,997,804
3,944,785	3,979,338	3,991,026	3,997,813
3,945,390	3,979,758	3,991,113	3,997,827
3,946,040	3,979,878	3,991,162	3,997,861
3,946,057	3,980,479	3,991,407	3,997,871
3,946,060	3,980,492	3,991,477	3,997,876
3,948,085	3,980,538	3,991,479	3,997,977
3,950,449	3,980,547	3,991,528	3,998,007
3,951,229	3,980,666	3,991,592	3,998,082
3,951,586	3,981,415	3,991,598	3,998,098
3,952,808	3,981,464	3,991,767	3,998,262
3,953,269	3,981,532	3,991,806	3,998,270
3,956,135	3,981,892	3,992,181	3,998,546
3,959,438	3,982,012	3,992,303	3,998,698
3,960,923	3,983,000	3,992,999	3,998,747
3,961,082	3,983,113	3,993,000	3,998,756
3,961,467	3,983,163	3,993,015	3,998,953
3,964,983	3,983,250	3,993,191	3,998,974
3,965,064	3,983,355	3,993,477	3,998,980
3,965,560	3,983,921	3,993,712	3,999,213
3,966,144	3,984,458	3,993,750	
3,966,416	3,984,650	3,993,784	
3,966,673	3,985,016	3,993,811	

Disclaimer and Dedication

3,890,526.—*Kazimir Palac*, Carpentersville, Ill. FACEPLATE MOUNTING STRUCTURE FOR CATHODE RAY TUBE COLOR SELECTION ELECTRODE. Patent dated June 17, 1975. Disclaimer and dedication filed Dec. 30, 1976, by the inventor, the assignee, *Zenith Radio Corporation*, consenting.

Hereby disclaims and dedicates to the Public all claims of said patent.

Dedications

3,394,352.—*Robert Wernikoff*, Cambridge, *Paul Epstein*, Brookline, and *William F. Schreiber*, Lexington, Mass. METHOD OF AND APPARATUS FOR CODE COMMUNICATION. Patent dated July 23, 1968. Dedication filed Dec. 15, 1976, by the assignee, *Xerox Corporation*.

Hereby dedicates to the People of the United States the remaining term of said patent.

3,581,734.—*Michael Emanuel Croslin*, Forest Hills, and *John Ronald Keller*, Babylon, N.Y. SPHYGMOMANOMETER. Patent dated June 1, 1971. Dedication filed Dec. 29, 1976, by the assignee, *Phelps Dodge Industries, Inc.*

Hereby dedicates the entire remaining term of said patent to the Public.

3,586,861.—*Robert E. Wernikoff*, Belmont, Mass. LIGHT PEN COMPRISING SENSORS EACH SENSITIVE TO A DIFFERENT WAVELENGTH AND CORRESPONDING FILTERS ARRANGED TO SELECTIVELY PROVIDE BOTH LARGE AND SMALL EFFECTIVE APERTURES. Patent dated June 22, 1971. Dedication filed Dec. 15, 1976, by the assignee, *Xerox Corporation*.

Hereby dedicates to the People of the United States the remaining term of said patent.

3,646,257.—*Paul Epstein*, Brookline, *James Cunningham*, Cambridge, *Robert E. Wernikoff*, Belmont, and *George Rosen*, Brookline, Mass. COMMUNICATION SYSTEM HAVING PLURAL CODING VOCABULARIES. Patent dated Feb. 29, 1972. Dedication filed Dec. 15, 1976, by the assignee, *Xerox Corporation*.

Hereby dedicates to the People of the United States the remaining term of said patent.

3,654,846.—*Robert E. Wernikoff*, Belmont, *David M. Perozek*, Watertown, and *Jana M. Roten*, Brookline, Mass. ELECTRO-MECHANICAL SHUTTER ARRAY. Patent dated Apr. 11, 1972. Dedication filed Dec. 15, 1976, by the assignee, *Xerox Corporation*.

Hereby dedicates to the People of the United States the remaining term of said patent.

3,686,372.—*John C. Hiatt*, Brandon, Fla., and *John P. Luker*, Houston, Tex. METHOD FOR MAKING CEMENT. Patent dated Aug. 15, 1972. Dedication filed Dec. 20, 1976, by the assignee, *Dillingham Corporation*.

Hereby dedicates to the Public the entire remaining term of said patent.

3,700,797.—*Robert E. Wernikoff*, Belmont, Mass. FACSIMILE NOISE DELETION AND CODING SYSTEM. Patent dated Oct. 24, 1972. Dedication filed Dec. 15, 1976, by the assignee, *Xerox Corporation*.

Hereby dedicates to the People of the United States the remaining term of said patent.

3,723,649.—*Alexander D. Pitegoff*, Brookline, *Robert E. Wernikoff*, Cambridge, and *James E. Cunningham*, Brookline, Mass. ADAPTIVE BINARY STATE DECISION SYSTEM. Patent dated Mar. 27, 1973. Dedication filed Dec. 15, 1976, by the assignee, *Xerox Corporation*.

Hereby dedicates to the People of the United States the remaining term of said patent.

3,739,085.—*George Rosen* and *Paul Epstein*, Brookline, and *Robert E. Wernikoff*, Cambridge, Mass. CODING TECHNIQUE. Patent dated June 12, 1973. Dedication filed Dec. 15, 1976, by the assignee, *Xerox Corporation*.

Hereby dedicates to the People of the United States the remaining term of said patent.

3,748,379.—*Paul Epstein*, Brookline, *Robert E. Wernikoff*, Belmont, and *James E. Cunningham* and *George Rosen*, Brookline, Mass. RUN LENGTH CODING TECHNIQUE. Patent dated July 24, 1973. Dedication filed Dec. 15, 1976, by the assignee, *Xerox Corporation*.

Hereby dedicates to the Public the entire remaining term of remaining term of said patent.

3,751,582.—*Robert E. Wernikoff* and *Joseph M. Van Horn*, Cambridge, Mass. and *Albert E. Mignone*, deceased, late of Shaker Heights, Ohio, by Gilda Mignone, executrix, Barrington, R.I. STORED PROGRAM FACSIMILE CONTROL SYSTEM. Patent dated Aug. 7, 1973. Dedication filed Dec. 15, 1976, by the assignee, *Xerox Corporation*.

Hereby dedicates to the People of the United States the remaining term of said patent.

3,763,613.—*Harry H. Wise*, Somerville, N.J. COMPOSITE CONCRETE CONSTRUCTION OF TWO-WAY SLABS AND FLAT SLABS. Patent dated Oct. 9, 1973. Dedication filed Dec. 28, 1976, by the assignee, *Johns-Manville Corporation*.

Hereby dedicates to the Public the entire remaining term of said patent.

3,839,675.—*Robert E. Wernikoff*, Boston, and *George Rosen*, Brookline, Mass. DELTA MODULATION COMMUNICATION SYSTEM. Patent dated Oct. 1, 1974. Dedication filed Dec. 15, 1976, by the assignee, *Xerox Corporation*.

Hereby dedicates to the People of the United States the remaining term of said patent.

3,914,879.—*Edwin J. Taylor III*, North Oakes, and *James E. La Fortune*, Blaine, Minn. FIREARMS TRAINING APPARATUS AND METHOD. Patent dated Oct. 28, 1975. Dedication filed Dec. 15, 1976, by the assignee, *Advanced Training Systems, Inc.*

Hereby dedicates to the Public the entire term of said patent.

3,915,371.—*Kenneth L. Crabtree*, Fairfield, Maine. NESTABLE TRAY WITH CUP SUPPORTING RECESS. Patent dated Oct. 28, 1975. Dedication filed Dec. 15, 1976, by the assignee, *Keyes Fibre Company*.

Hereby dedicates to the Public the entire term of said patent.

3,974,607.—*Henry A. Balinski*, Hoffman Estates, Ill. FIRE-RATED COMMON AREA SEPARATION WALL STRUCTURE HAVING BREAK-AWAY CLIPS. Patent dated Aug. 17, 1976. Dedication filed Nov. 23, 1976, by the assignee, *United States Gypsum Company*.

Hereby dedicates to the Public the entire remaining term of said patent.

Disclaimers

3,354,059.—*Herman Koretzky*, Poughkeepsie, N.Y. ELECTRODEPOSITION OF NICKEL-IRON MAGNETIC ALLOY FILMS. Patent dated Nov. 21, 1967. Disclaimer filed Dec. 9, 1976, by the assignee, *International Business Machines Corporation*.

Hereby enters this disclaimer to all claims of said patent.

3,609,151.—*Florin Seng*, Cologne, *Kurt Ley*, Odenthal, *Karl Georg Metzger*, Wuppertal-Elberfeld, and *Dieter Fritsche*, Wuppertal-Vohwinkel, Germany. 2-AMINO - 3 - CARBAMIDO-QUINOXALINE-DI - N - OXIDES AND THEIR PRODUCTION. Patent dated Sept. 28, 1971. Disclaimer filed Jan. 7, 1977, by the assignee, *Bayer Aktiengesellschaft*.

Hereby enters this disclaimer to claim 8 of said patent.

3,612,066.—*Samuel O. Jones*, *James Gilbert Ashburn*, *Grant M. Stewart*, and *Glenn Philip Moser*, Winston-Salem, N.C. DENICOTINIZING PROCESS. Patent dated Oct. 12, 1971. Disclaimer filed June 21, 1976, by the assignee, *Reynolds Leasing Corporation*.

Hereby enters this disclaimer to claims 1 through 7, inclusive of said patent.

3,780,311.—*Verne R. Brown*, Ann Arbor, Mich. BREATH ALCOHOL DETECTOR AND AUTOMOTIVE IGNITION INTERLOCK EMPLOYING SAME. Patent dated Dec. 18, 1973. Disclaimer filed July 22, 1976, by the assignee, *Borg-Warner Corporation*.

Hereby enters this disclaimer to claims 1–11, inclusive and 13 and 16 of said patent.

3,785,092. *Alma A. Hutchins*, Pasadena, Calif. ABRADING TOOL HAVING SUCTION SYSTEM FOR COLLECTING ABRADED PARTICLES. Patent dated Jan. 15, 1974. Disclaimer filed Jan. 3, 1977, by the inventor.

Hereby enters this disclaimer to claims 1, 3 and 5 of said patent.

3,790,839.—*Leonard Dietch*, Skokie, Ill. RECTANGULAR GRADE BLACK SURROUND SCREEN. Patent dated Feb. 5, 1974. Disclaimer filed Nov. 26, 1976, by the inventor, the assignee, *Zenith Radio Corporation*, consenting.

Hereby enters this disclaimer to all claims of said patent.

3,876,472.—*Murray Arthur Polinsky*, Somerville, N.J. METHOD OF ACHIEVING SEMICONDUCTOR SUBSTRATES HAVING SIMILAR SURFACE RESISTIVITY. Patent dated Apr. 8, 1975. Disclaimer filed Dec. 16, 1976, by the assignee, *RCA Corporation*.

Hereby enters this disclaimer to claims 1, 5, 6 and 8 of said patent.

3,909,087.—*James Cairns*, Cherry Hill, N.J. COMPOSITE BEARINGS. Patent dated Sept. 30, 1975. Disclaimer filed Dec. 20, 1976, by the assignee, *Garlock Inc.*

Hereby enters this disclaimer to claims 1–4, 6–8, 12, 14–17, 19–21 and 25 of said patent.

3,930,740.—*Bradshaw Bowman*, Carmel, Calif. TOOLS FOR IMPRINTING NON-REPEATING STONE PATTERNS IN FRESH CONCRETE. Patent dated Jan. 6, 1975. Disclaimer filed Nov. 19, 1976, by the assignee, *Bomanite Corporation*.

Hereby enters this disclaimer to claims 1, 2, 3 and 4 of said patent.

3,950,417.—*Robert J. Verdicchio*, Succasunna, and *John M. Waltz*, Clark, N.J. HIGH-LATHERING NON-IRRITATING DETERGENT COMPOSITIONS. Patent dated Apr. 13, 1976. Disclaimer filed Dec. 27, 1976, by the assignee, *Johnson & Johnson*.

Hereby enters this disclaimer to claims 1–12, inclusive, of said patent.

3,951,471.—*Joseph G. Langenstein*, Edelstein, Ill. RECIRCULATING BALL BEARING ASSEMBLY FOR FORK LIFT MAST UNITS. Patent dated Apr. 20, 1976. Disclaimer filed Dec. 22, 1976, by the assignee, *Caterpillar Tractor Co.*

Hereby enters this disclaimer to claims 1 through 25 of said patent.

3,991,630.—*Daniel J. Toby*, South San Francisco, Calif. VARIABLE FEED DRIVE MECHANISM. Patent dated Nov. 16, 1976. Disclaimer filed Jan. 6, 1977, by the assignee, *Toby Enterprises*.

Hereby enters this disclaimer to claims 1–4 of said patent.

Service by Publication

Shiro Tom Ito

In accordance with 37 CFR 1.47(a) (Rules of Practice in Patent Cases), notice is hereby given of the filing on December 8, 1975, of an application for patent entitled "Solenoid Circuit for Pushbutton Release in Telephones," on behalf of Shiro Tom Ito, whose last known address is 167 Mary Avenue, London, Ontario, Canada. The application was made in compliance with 37 CFR 1.47(a) and 35 U.S.C. 116 by Graham Stirling Laing without execution by the said Shiro Tom Ito. Notice of the filing directed to the above noted address has been returned undelivered.

Any action to be taken by the said Shiro Tom Ito in connection with the said application must be taken within thirty (30) days of the publication of this notice.

RENE D. TEGTMEYER,
Assistant Commissioner for Patents.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF JANUARY 29, 1977

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	6-17-76
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	6-16-76
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	1-3-76
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	4-22-76
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	2-20-76
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	10-15-75
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	3-1-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	1-2-76
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	8-6-76
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	4-2-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	7-23-75
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	3-26-76
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking: Tools; Cutlery; Jacks.	7-2-76
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	5-3-76
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	2-2-76
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	7-1-76

Expiration of patents: The patents within the range of numbers indicated below expire during February 1977, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,923,008 to 2,926,351, inclusive

Plant Patents..... Numbers 1,901 to 1,918, inclusive

DEFENSIVE PUBLICATIONS

PUBLISHED MARCH 1, 1977

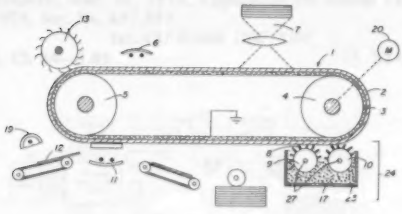
Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O.G. 687. The abstracts of Defensive Publication applications are identified by distinctly numbered series and are arranged chronologically. The heading of each abstract indicates the number of pages of specification, including claims and sheets of drawings contained in the application as originally filed. The files of these applications are available to the public for inspection and reproduction may be purchased for 30 cents a sheet.

Defensive Publication applications have not been examined as to the merits of alleged invention. The Patent and Trademark Office makes no assertion as to the novelty of the disclosed subject matter.

T956,001
ELECTROGRAPHIC APPARATUS AND PROCESS FOR HUMIDITY STABILIZED DEVELOPMENT

George P. Kasper, and Robert J. O'Brien, both c/o Kodak Park Division, Rochester, N.Y. 14650

Continuation of Ser. No. 571,674, April 25, 1975. This application July 19, 1976, Ser. No. 706,328
Int. Cl.² G03G *13/08*
U.S. Cl. 96—1 SD
3 Sheets Drawing. 25 Pages Specification



An electrographic apparatus for applying a dry particulate developer mix comprising a triboelectric mixture of toner powder and carrier particles to an electrostatic image and a process for using the same are disclosed. The apparatus includes developing means for applying the developer mix to the electrostatic image and heat generating means associated with the developing means to directly heat the developer mix whereby the developer mix is electrically stabilized against relative humidity effects, particularly high relative humidity conditions.

T956,002
WATERFLOODING METHOD USING SULFONATES

Roy C. Sias, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.

Filed Feb. 20, 1976, Ser. No. 659,617
Int. Cl.² E21B *43/22*
U.S. Cl. 252—8.55 D
No Drawing. 12 Pages Specification

A method for recovering hydrocarbons from a petroliferous formation is disclosed. The method comprises injecting into a petroliferous formation an effective amount of an aqueous mixture which contains about 0.5 to about 25 weight percent of an alkali metal hydrocarbon sulfonate mixture and recovering the displaced hydrocarbons from the formation. An important feature of the method is that the alkali metal hydrocarbon sulfonate mixture is prepared by the process of:

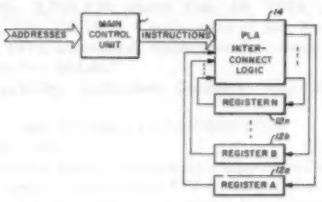
a. sulfonating an admixture of (i) an aromatic-containing refinery stream and (ii) a synthetic hydrocarbon sulfonatable feedstock,
b. recovering from the reaction mass of step (a) the admixture of hydrocarbon sulfonic acids, and
c. converting the hydrocarbon sulfonic acids to the alkali metal salts.

A suitable refinery stream is pale oil extract. Suitable synthetic sulfonatable feedstocks include alkaryl hydrocabons. Inclusion of the synthetic hydrocarbon with the refinery stream results in a product having a lower viscosity than the sulfonate from the refinery stream per se. This lower viscosity results in an improvement when using the sulfonate to recover hydrocarbon from a petroliferous formation.

T956,003
INTERCONNECT LOGIC FOR A SERIAL PROCESSOR

Richard B. Simone, Santa Clara, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Continuation of Ser. No. 584,637, June 6, 1975, abandoned. This application June 14, 1976, Ser. No. 695,675
Int. Cl.² G06F *9/00*
U.S. Cl. 340—172.5
1 Sheets Drawing. 7 Pages Specification



The interconnect logic between a main control unit and the data handling register of a serial processor is formed of a programmable logic array (PLA). The serial processor includes a main control unit, a plurality of registers and PLA interconnect logic. The interconnect logic decodes and implements instructions supplied from the main control unit to control the flow of data into and out of the serial registers. The interconnect logic includes a plurality of input terminals I_1–I_m; D_1–D_n and a plurality of output terminals A–N. The input lines are connected to a plurality of lines directly and to another plurality of lines indirectly through inverters. A plurality of AND gates **34** are provided with their inputs connected to various ones of the lines. The outputs of the AND gates are connected to various ones of the inputs to the OR gate **36.** If the PLA is made in integrated circuit technology, the selected connections are mask options which are represented in the drawing by an X at each of the connections.

The input terminals I_1–I_m are adapted to receive instructions from the main control unit. The input terminals D_1–D_n are adapted to receive the outputs of respective ones of the general registers. Accordingly, selected inputs from the instructions supplied by the main control unit are their complements as provided by the inverters and selected inputs from the registers and their complements as provided by the inverters may be connected by mask options to the inputs of any one of the AND gates **34.** The output of the AND gates. form partial product terms. Selected ones of the partial product terms may therefore be connected by mask options to the inputs of any one of the OR gates **36** to form outputs on the output terminal **20.** Thus, the circuit can be used to transfer data between registers and to recirculate data within a register.

T956,004
ETHYLENE POLYMERS

Denis George Harold Ballard; Eric Jones, and John Christopher Padget, all of Runcorn, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Mar. 8, 1976, Ser. No. 664,984

Claims priority, application United Kingdom, Mar. 7, 1975, 9563/75

Int. Cl.² C08F *10/14*

U.S. Cl. 526—350

4 Sheets Drawing. 49 Pages Specification

A copolymer of ethylene with at least one other mono-α-olefine is prepared and is characterized as having a density in the range 918 to 940 Kg/m³, an apparent viscosity (A) at 200° C and a shear rate of 100 sec^{-1} of 0.5×10^3 to 3.0×10^3 Nsm^{-2} and a viscosity at 200° C and a stress of 10^5 N/m^2 of 2 $Ae^{(1.6A \times 10^{-5})}$ to 10,000 A.

The copolymer from which the film is formed is preferably one in which the comonomer contains at least 5 carbon atoms; the comonomer may contain up to 12 carbon atoms. Hexene-1 is the preferred comonomer and can be present in the copolymer in an amount of 6.5 to 16.5%, by weight.

The copolymers are readily processed and can be formed into films which combine good stiffness and good impact properties.

The copolymers are conveniently prepared using supported transition metal benzyl compounds followed by a total work-up of the polymerization mixture. In particular, a process for forming the copolymers includes copolymerizing ethylene and the comonomer in the presence of a transition metal olefine polymerization catalyst and separating a polymeric product having an annealed characteristic set forth above.

REISSUES

MARCH 1, 1977

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

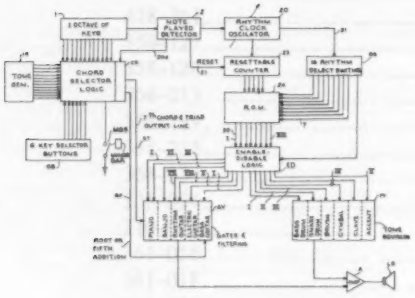
Re. 29,144
AUTOMATIC CHORD AND RHYTHM SYSTEM FOR ELECTRONIC ORGAN

David A. Bunger, Cincinnati, Ohio, assignor to D. H. Baldwin Company, Cincinnati, Ohio

Original No. 3,918,341, dated Nov. 11, 1975, Ser. No. 454,426, Mar. 25, 1974. Application for reissue Feb. 12, 1976, Ser. No. 657,359

Int. Cl.² G10H *1/00, 5/00*

U.S. Cl. 84—1.01 **22 Claims**



22. In an electronic organ, an array of playing keys, means responsive to actuation of selected ones of said array of playing keys for sounding chords, means for selecting rhythmic patterns, means for sounding said chords in a selected rhythmic pattern in a first sequence of rhythm accompaniment voices in response to actuation of first predetermined selected ones of said array of playing keys, and for sounding said chords in said selected rhythmic pattern in a second sequence of rhythm accompaniment voices in response to actuation of second predetermined selected ones of said array of playing keys.

Re. 29,145
CATALYST FOR SULFURIC ACID CONTACT PROCESS

Ludwig Dorn, Cologne; Gerhard Heinze, Schelogen; Jürgen Wokulat; Wilhelm Möller, both of Leverkusen, all of Germany; Franz Rübsam, deceased, late of Leverkusen, Germany, by Marianne Rübsam; by Ralph Wilhelm Rübsam, heir, Leverkusen, Germany; by Marion Mathilde Emilie Rübsam, heir, Leverkusen, Germany, and by Bernd Friedrich Konrad Rübsam, heir, Leverkusen, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Original No. 3,793,230, dated Feb. 19, 1974, Ser. No. 229,163, Feb. 24, 1972. Continuation of Ser. No. 36,234, May 11, 1970, abandoned. Application for reissue Aug. 14, 1975, Ser. No. 604,867

Claims priority, application Germany, May 23, 1969, 1926564

Int. Cl.² B01J *11/34;* **C01B** *17/78*

U.S. Cl. 252—452 **14 Claims**

7. A *bead-form* catalyst comprising a support and activating agent, the support being at least 97% by weight of amorphous silica, based on the calcined support, the activating agent being from 4 to 8% by weight of V_2O_5 and 3.1 to 12.4% by weight of K_2O, based on the impregnated anhydrous catalyst, a portion of pores with diameters of from about 100 to 1500° A. of at least 80% of the total pore volume present [.], *said catalyst having an abrasion resistance of about 0 to 3% by weight.*

PLANT PATENTS

GRANTED MARCH 1, 1977

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,019
ROSE PLANT

William A. Warriner, Tustin, Calif., assignor to Jackson & Perkins Co., Medford, Oreg.

Filed Jan. 21, 1976, Ser. No. 650,913
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—14 1 Claim

1. A new and distinct cultivar of rose plant of the hybrid tea class, substantially as herein shown and described, characterized particularly as to novelty by the unique combination of a vigorous, upright habit of growth, stiff, straight, strong stems, particularly suitable for use as a greenhouse grown cut flower, Garnet Brown new foliage, white to near white (very light Chartreuse Green) buds and open blooms, very light musky fragrance.

4,020
STRAWBERRY PLANT

Harold A. Johnson, Jr., Watsonville, Calif., assignor to Driscol Strawberry Associates, Inc., Watsonville, Calif.

Filed Apr. 7, 1976, Ser. No. 674,455
Int. Cl.[2] A01H *5/03*
U.S. Cl. Plt.—49 1 Claim

1. The new and distinct variety of strawberry plant herein described and illustrated, and identified by the characteristics enumerated above.

PATENTS

GRANTED MARCH 1, 1977

ERRATA

For CLASS	See PATENT NO.
264–210 F	4,009,511
350–035	4,009,526
111–006	4,009,666
424–275	4,009,847
354–029	4,009,866
029–523.2	4,010,043
429–082	4,010,044
053–067	4,010,100
428–035	4,010,139
156–578	4,010,203
428–361	4,010,295
358–127	4,010,317
358–128	4,010,318
358–213	4,010,319
358–289	4,010,320
358–233	4,010,321
358–233	4,010,322
235–054	4,010,353
210–071	4,010,391
361–056	4,010,402
361–018	4,010,403
361–179	4,010,404
361–433	4,010,405
361–433	4,010,406

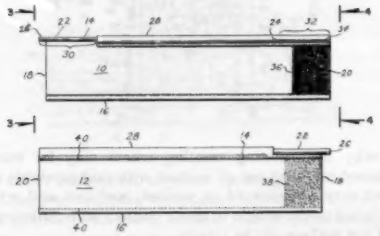
PATENTS

GRANTED MARCH 1, 1977

NOTE: A cross reference listing of applications published under the second Trial Voluntary Protest Program is located in the back of this Issue. These entries will be in numerical order by document publication number.

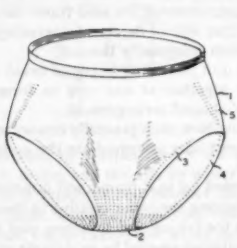
GENERAL AND MECHANICAL

4,009,494
PROTECTIVE COVERING
Max J. Nusbaum, 30 Arlo Road, Staten Island, N.Y. 10301
Filed Oct. 28, 1975, Ser. No. 626,312
Int. Cl.² A41D *13/00*
U.S. Cl. 2—2 **9 Claims**



1. A protective covering for preventing water from contacting a portion of the body, comprising:
a sheet of flexible fluid-impervious material having a front and back surface, and a top, bottom and two side edges, said sheet being sized so that the edges thereof overlap when placed on the body portion,
fastening means for holding said edges in overlapping relationship to retain said sheet around the body portion;
a flexible rod attached to and extending along the greater part of the top of the sheet from one edge thereof, and
an open ended flexible sleeve attached to the top of the sheet and extending from the other edge thereof, said sleeve covering at least a part of said flexible rod, the open end of said sleeve telescopically receiving the uncovered part of the rod when said sheet encircles said body portion, wherein the covered rod forms a seal against the body for preventing water from reaching the body portion, and
wherein the part of said sleeve which telescopically receives said rod includes a longitudinal slot therein to accommodate passage of said one edge therethrough.

4,009,495
VENTILATED BRIEFS
Martin H. Faust, Wyomissing Hills, Pa., assignor to Penn-Dale Knitting Mills, Inc., Sinking Spring, Pa.
Filed Apr. 25, 1975, Ser. No. 571,555
Int. Cl.² A41B *9/04*
U.S. Cl. 2—406 **1 Claim**

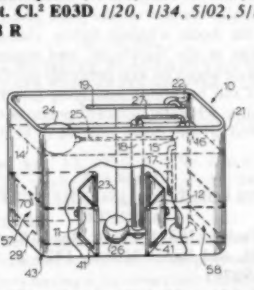


1. A panty knit of synthetic plastic threads throughout the entire body portion with the exception of a crotch and leg surrounding portions which crotch and leg surrounding portions are integrally knit thereto by cotton thread formed of a core of stretch yarn around which cotton thread is helically wound which forms courses of considerably larger sized mesh openings extending across the entire width of said crotch portion and being devoid of seams throughout the entire area of said crotch portion so as to provide a high degree of ventilation and perspiration absorption and a further exception of integrally knit cotton thread portions of considerably larger sized mesh openings being provided also along the sides of the panty.

4,009,496
PROSTHETIC ADAPTER FOR SKI POLES AND THE LIKE
Ralph Samuel Allen, III, 1610 Dahlia St., Denver, Colo. 80220
Filed May 24, 1976, Ser. No. 689,468
Int. Cl.² A61F *1/06*
U.S. Cl. 3—12.8 **11 Claims**

1. In a prosthetic device adapted for releasable attachment of an artificial hand to an article having an elongated handle portion wherein the artificial hand includes spaced hook portions, said prosthetic device comprising a pair of generally loop-shaped first and second fasteners disposed on opposite sides of the handle, each fastener being sized to provide an opening therein adapted for insertion of one of the hooks on the artificial hand, each of said fasteners including connector means for connecting said fastener to the handle in spaced offset relation to the connector means for said other fastener.

4,009,497
WATER SAVING PANEL DEVICE FOR WATER CLOSETS
Jacob R. Moon, Hillsborough, N.C., assignor to Moon Walter Saver, Inc., Hillsborough, N.C.
Filed Apr. 19, 1972, Ser. No. 245,531
Int. Cl.² E03D *1/20, 1/34, 5/02, 5/10*
U.S. Cl. 4—18 R **10 Claims**



10. In a water closet having a flush tank formed by bottom and side walls and providing a hydraulic head and storage of predetermined height and capacity, having an outlet valve assembly mounted in the bottom wall of the tank and communicating with a toilet bowl, having manual handle means to open the valve to empty the tank and cooperative water sup-

ply means for refilling the tank upon the outlet valve returning to a closed position, the opening of the outlet valve normally causing initiation of the flushing and bowl evacuation followed by substantial emptying of the tank and subsequent closing of the outlet valve, the improvement comprising, in combination:

At least one rectangular panel member adapted to be vertically positioned and fixably retained in spaced relation to the outlet valve whereby the panel member contacts opposite interior vertical wall surfaces of the said tank and a bottom horizontal edge of said panel member contacts the interior bottom wall surface of the tank to form in effect an open top column of less height than the normal water storage height and extending above and around the outlet valve assembly and closed at the bottom by the bottom wall of the tank and bounded at the side by said interior wall surfaces forming a continuation of the wall area of said panel member.

4,009,498

BOOKBINDING SYSTEM

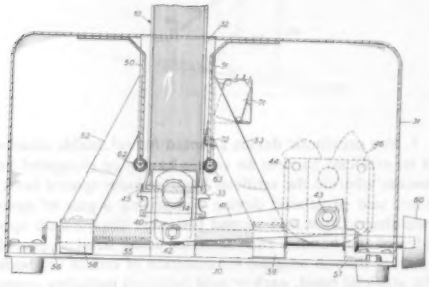
Henry N. Staats, Deerfield, and Robert K. Newcomb, Wilmette, both of Ill., assignors to General Binding Corporation, Northbrook, Ill.

Continuation of Ser. No. 265,305, June 22, 1972, abandoned. This application May 12, 1975, Ser. No. 576,385

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976

Int. Cl.[2] B42C *19/00*

U.S. Cl. 11—1 AD **3 Claims**



1. A binding apparatus for binding a book having a plurality of pages for securement to a generally flat backbone pivotally connected to front and back covers, comprising a generally flat plate, means for selectively heating said plate, means contacting the covers of said book along generally horizontal lines of contact above said plate for maintaining the pages of the book generally vertical on the plate and establishing the thickness of the book without tightly clamping the pages thereof together at the backbone, and means for pivotally rocking said plate about an axis generally parallel to the longitudinal axis of the backbone and lying generally within the plane of the plate whereby adjacent portions of the plate are cyclically moved up and down relative to each other.

4,009,499

APPARATUS FOR TREATING THE SURFACE OF AN ARTICLE

William H. Casler, 35321 Beach Road, Capistrano Beach, Calif. 92624, and Lance Morris, 1426 E. 15th St., Santa Ana, Calif. 92701

Filed Mar. 25, 1976, Ser. No. 670,392

Int. Cl.[2] A46B *13/02*

U.S. Cl. 15—21 D **9 Claims**

1. Apparatus for treating a surface of an article of which at least a portion of said surface is non-planar, comprising:

a. a clamping table;

b. means for clamping the article to the table;

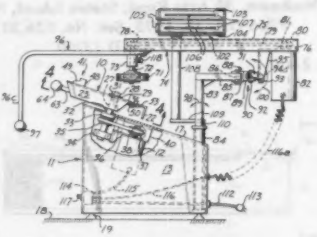
c. means for rotating the table and clamped article;

d. a treating wheel;

e. means for rotating the treating wheel;

f. support means supporting the treating wheel in proximity to the article; and

g. means for permitting universal movement of said support means,



whereby the rotating treating wheel may be manually moved into and out of contact with said rotatable article and may be oriented in various positions and attitudes relative to the article to make contact with different parts of the surface of the article.

4,009,500

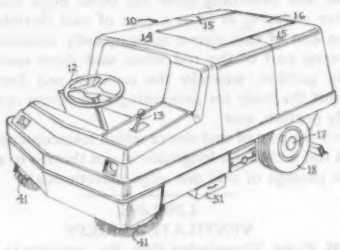
FLOOR SCRUBBING APPARATUS

Walter G. Ashton, Winnetka, Ill., assignor to Star Industries, Inc., Highland Park, Ill.

Filed Apr. 26, 1976, Ser. No. 680,364

Int. Cl.[2] A47L *11/29*

U.S. Cl. 15—50 R **8 Claims**



1. A floor scrubbing apparatus having an operator-driven wheeled vehicle including a single, front, steerable, drive wheel, wherein the improvement comprises

a. a frame for the wheeled vehicle,

b. a brush unit mounted on said frame so as to dispose a brush to either side of the front steerable drive wheel and a single brush rearwardly thereof,

c. said brush unit providing a pair of brush supporting bars connected together at one end to form a horizontally disposed V-shaped arrangement,

d. a pair of tow bars each pivotally connected to one of said brush support bars intermediate the ends thereof and to said frame,

e. means carried by said frame and connected to said tow bars for pivoting the same relative to their connection to said frame for raising and lowering said brush unit,

f. a refuse container carried by said frame adjacent to one of said brushes to collect debris swept by said brush, and

g. means for mounting said container on said frame and for connection to said brush unit so that said container may be pivoted into a raised and lowered position together with said brush unit by said first-mentioned means.

4,009,501

STREET AND PEDESTRIAN ZONE CLEANING MACHINE

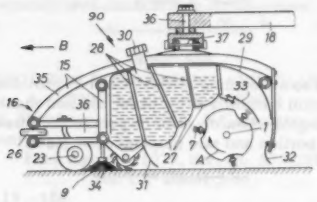
Johannes Straub, Fussener Strasse 32, 8950 Kaufbeuren, Germany

Filed Mar. 3, 1975, Ser. No. 554,441

Claims priority, application Germany, July 26, 1974, 2436114

Int. Cl.² E01H 1/04

U.S. Cl. 15—84 **10 Claims**



1. A street and pedestrian zone cleaning machine comprising: at least one sweeping mechanism arrangement comprising a brush cylinder with plural brushes rotatably mounted on the machine and adapted to sweep the surface to be cleaned, a permeable sack mounted on said machine extending closely adjacent the surface of said brush cylinder, said sack containing liquid maintaining a surface of said sack damp causing the dust swept by said brush cylinder to collect on said surface of said sack; a receptacle arrangement mounted on said machine adjacent one end of said brush cylinder so as to collect the scales of dust which fall from said surface of said sack, said receptacle arrangement including a brushing means and a means for receiving the material brushed by said brushing means; and said brushes of said brush cylinder being twisted in such a direction so as to cause the dust scales which fall from said sack to be swept in the direction of said receptacle arrangement.

4,009,502

WIPER DEVICE

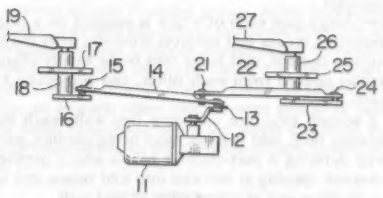
Sumio Tamaki, Kariya, and Isao Ito, Handa, both of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Aug. 19, 1975, Ser. No. 605,883

Claims priority, application Japan, Sept. 9, 1974, 49-108282[U]; Feb. 27, 1975, 50-27363[U]

Int. Cl.² B60S 1/08

U.S. Cl. 15—250.27 **3 Claims**



1. An improvement in a wiper device for wiping the windowpanes of cars, ships, and the like by wiper blades reciprocally movable in a synchronized manner through pivotally mounted wiper arms, comprising driving means including a wiper motor arranged between the wiper arms centrally of their pivot points, a crank arm connected at one of its ends to the driving means and having securely fixed to the opposite end thereof first pin means provided with a ball portion, a single first link means rotatably mounted at one of its ends on the ball portion of the first pin means and operatively connected at its opposite end to one of said wiper arms to impart a swinging movement to the wiper arm about its pivot point when said wiper motor is actuated, second pin means connected to the first link means intermediate its ends at a location adjacent to the mounting between the first pin means and said first link means, said second pin means also being connected to a second link means, said second pin means having a ball portion to which one of said link means is rotatably fitted, said second link means being connected to the other of said wiper arms to impart a swinging movement to said other wiper arm about its pivot point in synchronism with movement of the first link means, the driving force to said second link means being transmitted through the first link means.

4,009,503

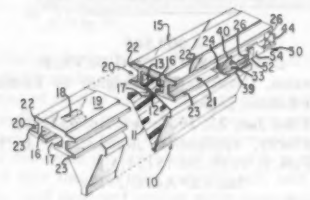
WIPER BLADE UNIT WITH FASTENING CLIP

Bernard C. Sharp, White Plains, N.Y., assignor to Parker-Hannifin Corporation, Shelton, Conn.

Filed Mar. 31, 1976, Ser. No. 672,245

Int. Cl.² B60S 1/04

U.S. Cl. 15—250.42 **13 Claims**



10. A resilient clip adapted to be secured to one end of the backing strip of a windshield wiper blade unit for fastening the blade unit detachably to a set of claws of a pressure-applying wiper blade holder, said backing strip having along its opposite sides laterally open channels each defined by upper and lower lateral flanges thereon, for receiving slidably, confining and bearing pressure from said claws, said lower flanges each having an opening formed therethrough near said one end, said clip being a unitary piece of resilient sheet metal formed to comprise a base portion for underlying an end portion of said strip, two resilient legs to extend forwardly from said base portion beneath said lower flanges and each having along a forward portion thereof an upturned ridge portion to protrude through one of said openings into the related strip channel for engagement with one of said claws, and side structures turned upwardly from opposite side edges of said base portion and providing oppositely disposed fingers to be crimped over and upon portions of said lower flanges so as to grip said base portion tightly to said strip.

4,009,504

SUPPORT OF THE WIPER BLADES IN THE WINDSHIELD WIPER INSTALLATIONS ON MOTOR VEHICLES IN GENERAL

Dario Arman, Via Venaria, 13/15, 10040 Druento, Torino, Italy

Filed Apr. 13, 1976, Ser. No. 676,629

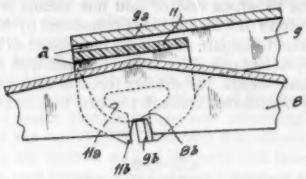
Claims priority, application Italy, Apr. 15, 1975, 67957/75

Int. Cl.² B60S 1/04

U.S. Cl. 15—250.42 **2 Claims**

1. A support for a wiper blade in a windshield wiper installation on motor vehicles comprising a support assembly formed by metal members having a traverse cross section substantially shaped like a U, comprising a main rod (**9**) whose ends (**9***a*) are articulated to the central portions of small secondary bridges (**8**), wherein each end of said main rod (**9**) is defined by fork-shaped side walls (**9***a*) and provided with a pair of transverse and opposed teeth (**9***b*) thereon projecting within said fork; each small secondary bridge (**8**) is centrally provided with a cut (**8***b*) on each side wall portion, each small

secondary bridge carries astride at the central portion thereof a gasket (**11**) of plastic material which is substantially shaped like a U having side walls extending to substantially the height of the side walls of said small bridge; each side wall of said gasket is provided with an open side seat (**11***a*); each end (**9***a*)

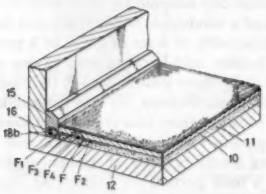


of said main rod is mounted astride said gasket (**11**) and is engaged with its teeth (**9***b*) within the seats (**11***a*) of said gasket (**11**) and within the cuts (**8***b*) of the corresponding small bridge (**8**) in order to form articulated connections between the ends of the main rod (**9**) and the bridges (**8**).

4,009,505
CARPET SECURING DEVICE

Ikuo Takamatsu, Uozu, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Japan

Filed Jan. 22, 1976, Ser. No. 651,546
Claims priority, application Japan, Feb. 1, 1975, 50-15133[U]; Feb. 1, 1975, 50-15134[U]
Int. Cl.² A47G *27/04*
U.S. Cl. 16—7 **4 Claims**



1. The combination with an anchoring means of an adapter for carpets and the like, said adapter comprising a longitudinal strip attached to a reverse surface of the carpet and a locking projection formed integral with and along a longitudinal edge of said strip, said anchoring means having an elongate channel and a slit communicating coextensively with said channel, and said locking projection protruding from an edge of the carpet, and retained in locked relation to said channel when said adapter is attached to the carpet, said adapter further comprising a sliding clasp fastener having a pair of opposed interlockable stringers, one of said stringers bearing said locking projection and the other stringer being attached to said reverse surface of the carpet.

4,009,506
BACKPLATE AND BAIL ASSEMBLY

Carl A. Henriksen, Grandville, Mich., assignor to Keeler Brass Company, Grand Rapids, Mich.

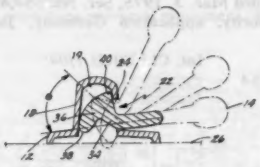
Filed Sept. 29, 1975, Ser. No. 617,425
Int. Cl.² A47B *95/02*
U.S. Cl. 16—126 **5 Claims**

1. A backplate and bail assembly, comprising:

a backpate;

a bail having an end portion, said end portion including a shank portion and a foot portion integral with and depending transversely from said shank portion said end portion including said foot portion extending in a plane perpendicular to said bail;

means a part of said backplate, for pivotally securing said bail at said bail end portion to said backplate without rotation of said backplate and only when said backplate is

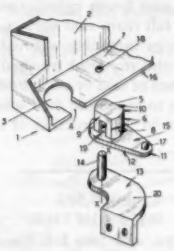


secured to a mounting surface, said bail providing a handle portion lying in a single plane and said shank portion being angled upwardly with respect to the plane of said handle portion and said perpendicular plane.

4,009,507
DOOR PIVOTING DEVICE

Alain Lascarrou, Epinay-sur-Seine, France, assignor to La Telemecanique Electrique, France

Filed Dec. 3, 1975, Ser. No. 637,258
Claims priority, application France, Dec. 17, 1974, 74.41482
Int. Cl.² E05D *7/12*
U.S. Cl. 16—171 **4 Claims**



1. An assembly of two relatively pivotable structures comprising in combination:

i. a first structure including two mounting means secured in spaced relationship and each having a bearing surface, the bearing surfaces being parallel to each other, and opposed,

ii. two hinge pins each of which is secured on a respective mounting means and projects normally from the bearing surface thereof, said hinge pins being axially aligned and axially spaced from each other, and projecting towards each other,

iii. a second structure including two walls each having a bearing face, said bearing faces being parallel, each such wall defining a part-circular recess and a parallel-sided channel opening at one end into said recess and opening at its other end at a free edge of said wall,

iv. a hinge member including a bearing element and a stud, said bearing element having a bore to receive a hinge pin, said bearing element having a first face normal to the axis of said bore to abut on a respective bearing surface, said stud projecting from an opposed second face of said bearing element, said stud having two diametrically opposed first sidewall surface portions which are of greater radial separation about the axis of said bore than the width of said channel, said stud having two diametrically opposed second sidewall surface portions which are of lesser radial separation about the axis of said bore than the width of said channel

v. means of said hinge member and on said second structure for retaining said hinge member releasably in a selected position of rotation of said stud in said part-circular recess,

whereby, with each hinge engaged on a respective hinge pin in a first position of rotation with respect to a respective wall, the walls can each receive the stud passed through the channel into the part-circular recess by reason of the lesser separation of the second sidewall portions, whereafter rotation of the hinge member into a second position of rotation causes the stud to be locked in the part-circular recess by reason of the greater separation of the first side wall portions.

4,009,508

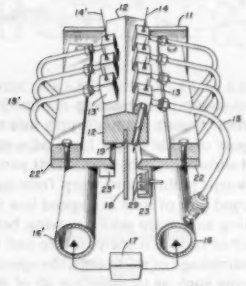
METHOD FOR FORWARDING AND CHARGING A BUNDLE OF FILAMENTS

Ernest M. Sternberg, Chapel Hill, N.C., assignor to Monsanto Company, St. Louis, Mo.

Filed Apr. 29, 1975, Ser. No. 573,275

Int. Cl.² D04H *3/00*

U.S. Cl. 19—155 **8 Claims**



1. The method of forwarding and charging filaments, comprising

a. forwarding a plurality of filament groups along parallel paths into impingement with a target electrode at spaced locations thereon, said filament groups each being forwarded in bundle configuration,

b. directing a plurality of electric fields to said locations to charge the filaments, said filaments being forwarded in such a manner that the filament configurations are transformed from a bundle configuration to a fan configuration under the influence of said impingement and said electric fields,

c. a portion of said filament groups being forwarded into impingement with one side of the target electrode and the remainder of said filament groups being forwarded into impingement with the opposite side of said target electrode in such a manner that the groups of said portion are adjacent to each other, the filament groups of said portion being positioned along the target electrode in staggered relationship to the filament groups of said remainder.

4,009,509

CABLE TIES

Mathew McCormick, East Didsbury, England, assignor to Bowthorp Hellerman Limited, Crawley, England

Filed Mar. 13, 1975, Ser. No. 558,004

Claims priority, application United Kingdom, Mar. 12, 1974, 11004/74; Nov. 20, 1974, 50373/74

Int. Cl.² B65D *63/00*

U.S. Cl. 24—16 PB **5 Claims**

1. A one-piece cable tie formed of synthetic plastic material, comprising

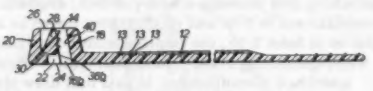
a. a flexible elongate strap including a strap portion (**12**), and an enlarged head portion (**14**) at one end of said strap portion, said head portion containing an aperture (**22**) of rectangular cross-sectional configuration extending generally normal to the plane of the strap portion, said aperture having opposed pairs of side and end walls;

b. said head portion containing

1. a pawl (**28**) disposed within said aperture and formed with a plurality of pawl teeth having crests which face a first one of said end walls and lie in a common plane generally perpendicular to the plane of said strap; and

2. pivot means (**30**) pivotally connecting one end of said pawl with the other end wall of said aperture for movement of said pawl teeth in respective arcs across said aperture in the longitudinal direction of said strap portion;

3. said first aperture end wall being inclined to the plane of the crests of the pawl teeth to define an abutment surface (**40**) which is so inclined that the pawl tooth



furtherest from the pawl pivot means is nearest said inclined abutment surface; and

c. a series of ratchet teeth (**13**) formed on and extending longitudinally on one surface of said strap portion, said pawl and ratchet teeth being complementary and so oriented that when the free end of the strap portion is introduced into the aperture end adjacent said pawl pivot means, said pawl and ratchet teeth cooperate to prevent removal of the strap portion from the aperture;

d. each of said pawl teeth including a first surface (**35***b*) generally facing the pawl pivot end of said aperture, and a second surface (**35***a*) facing the opposite end of said aperture, the second surfaces (**35***a*) of said pawl teeth lying substantially perpendicular to a radius passing through the pawl pivot axis, thereby to direct toward the pawl pivot axis the force (F) applied to said second pawl tooth surfaces by the corresponding ratchet teeth when the strap is tensioned in the withdrawal direction.

4,009,510

DEFLECTION DEVICE FOR SAFETY BELTS

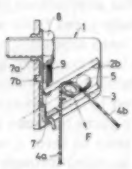
Oskar Lennart Lindblad, Hedasgatan 16, 440 20 Vargarda, Sweden

Filed Jan. 8, 1976, Ser. No. 647,518

Claims priority, application Sweden, Jan. 10, 1975, 7500247

Int. Cl.² A44B *11/10*

U.S. Cl. 24—196 **9 Claims**



1. A deflection device for a safety belt arrangement including a belt and belt collecting means, comprising: a bracket to be connected to a part of a vehicle, a bar about which a belt is adapted to pass, a stop, said bar being movable in a direction towards and away from said stop, an arm pivotally supporting said stop about an axis transverse to the longitudinal extension of a belt passed around said bar, said bar being movable along said arm in said transverse direction, said bar and stop being

arranged to permit the belt to run free about said bar when the belt is subjected to a force at least equivalent to the collecting force of said collecting means under normal conditions of use, and to lock the belt between said bar and said stop when the belt is subjected to abnormal forces.

4,009,511

PROCESS FOR DRAWING POLYAMIDE MONOFILAMENTS

Sibbley Paul Gauntt, Bon Air, Va., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 480,759, June 19, 1974, abandoned. This application Dec. 15, 1975, Ser. No. 641,135

Claims priority, application United Kingdom, July 4, 1973, 31809/73

Int. Cl.² D01D *5/12*

U.S. Cl. 264—210 F **9 Claims**

1. In a process including the coupled steps of spinning, quenching and drawing a heavy denier, aliphatic polyamide monofilament in first and second draw stages to a total draw ratio of at least 5.5×, the improvement comprising:

water-quenching the monofilament, advancing the quenched monofilament, in said first draw stage through a pressurized, surface-plasticizing, steam atmosphere wherein it is orientation-stretched at a ratio of at least 3.5×, and then

advancing the monofilament, in said second draw stage through a zone heated with a radiant heater at a temperature of 700° C.–1300° C. wherein it is orientation-stretched at a ratio of at least 1.3×.

4,009,512

METHOD FOR SIZING WARP YARNS

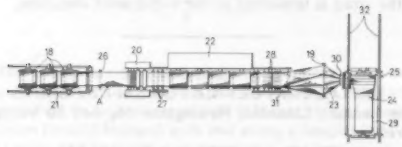
Hirohito Baba, No. 12-36, 2-chome, Yamate-cho, Suita, Osaka, Japan

Filed Sept. 10, 1975, Ser. No. 611,873

Claims priority, application Japan, Feb. 27, 1975, 50-24617

Int. Cl.² D02H *9/00, 5/02*

U.S. Cl. 28—72.6 **4 Claims**



1. A method for sizing warp yarns for yarn dyed fabric comprising the steps of:

a. forming a plurality of warpers beams by the steps of:

1. arranging a plurality of cheeses on a cheese creel which is sufficient for forming only a fraction of a predetermined pattern for one section of the fabric;
2. winding the warp yarns from said cheeses through a first lease reed onto a beam;
3. inserting a first lease cord through the ends of the warp yarns on said beam by use of said first lease reed just before a required length of yarns is wound thereon;
4. cutting the warp yarns between said first lease cord and said first lease reed to form a warpers beam with said first lease cord inserted through the yarn ends thereon;

b. mounting on a beam creel a required number of thus formed warpers beams;

c. passing the yarns from said warpers beams through a second lease reed into parallel side-by-side relation for the predetermined pattern;

d. guiding the warp yarns by means of said second lease reed through a sizing unit, a drying unit and separating rollers and onto a winding drum with the warp yarns from the respective warpers beams in side-by-side relation;

e. mounting said second lease reed on a reed holder provided between said separating rollers and said winding drum;

f. inserting a second lease cord through the ends of the warp yarns by use of said second lease reed before starting winding on said winding drum;

g. running the warp yarns through said sizing unit and said drying unit for sizing and winding said sized and dried warp yarns on said winding drum in the aforementioned side-by-side relation; and

h. rewinding said sized and dried yarns on a beam by means of a rewinder to form a loom beam with said second lease cords at the ends of yarns.

4,009,513

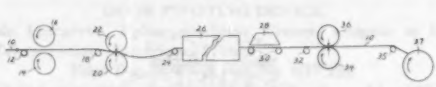
PRODUCTION OF WARP OF TEXTURED YARNS OF UNIFORM PROPERTIES

Bjorn A. Andersen, Horseleg Creek Road, Rome, Ga. 30161

Filed Feb. 2, 1976, Ser. No. 654,669

Int. Cl.² D02H *11/00;* **D02J** *1/02*

U.S. Cl. 28—72.6 **7 Claims**



1. A process comprising passing a plurality of synthetic yarns having latent texture from a supply into and through the nip of a first pair of rolls in the form of a warp, said yarns having residual shrinkage, driving said first pair of rolls so as to advance said warp, pulling said warp from said first pair of rolls with a second pair of rolls at a speed less than that of said first pair, heating said warp while moving between said first and second pair of rolls at a temperature and for a time sufficient to effect shrinkage of said yarns, the speed of said second pair of rolls being such as to maintain all of the yarns of said warp under almost tension-free condition between said first pair of rolls and the point of heating, and periodically separating said first pair of rolls from one another, whereby slack accumulated in individual yarns between said first and second pairs of rolls will be taken out and said yarns will be restored to equal tensions and a warp of pre-shrunk equally tensioned but almost tension-free synthetic yarns will issue from said second pair of rolls.

4,009,514

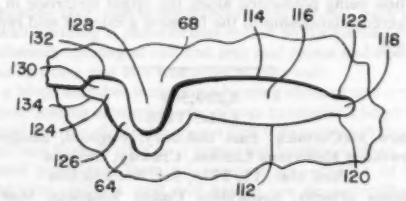
DIE SET

Luis R. Couto, Elizabeth, N.J., assignor to Thomas & Betts Corporation, Elizabeth, N.J.

Division of Ser. No. 566,192, April 9, 1975. This application Sept. 30, 1975, Ser. No. 618,150

Int. Cl.² B21F *1/00*

U.S. Cl. 29—751 **4 Claims**



1. A die set comprising: a first die member and a second die member; said first die member having a first crimping nest; first and second expansion zones, one to each side of said first crimping nest for receiving any material flowing out from said

first crimping nest when an electrical terminal is crimped within said first crimping nest; a second crimping nest in said first die member; third and fourth expansion zones, one to each side of said second crimping nest for receiving any material flowing out from said crimping nest when an electrical terminal is crimped within said second crimping nest; said second and said third expansion zones overlapping one another to decrease the overall length of said first die member required to accommodate both said first and said second crimping nests; a third crimping nest in said second die member arranged to be aligned with and cooperate with said first crimping nest; fifth and sixth expansion zones, one to each side of said third crimping nest for receiving any material flowing out from said third crimping nest when an electrical terminal is crimped within said first and third crimping nests; a fourth crimping nest in said second die member arranged to be aligned with and cooperate with said second crimping nest; seventh and eighth expansion zones, one to each side of said fourth crimping nest for receiving any material flowing out from said fourth crimping nest when an electrical terminal is crimped within said second and said fourth crimping nests; said sixth and said seventh expansion zones overlapping one another to decrease the overall length of said second die member required to accommodate both said third and said fourth crimping nests.

4,009,515

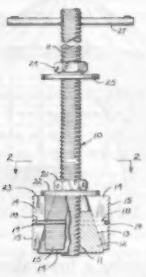
DISC BRAKE PISTON PULLER

Charles Racin, 2713 W. Comet Road, Clinton, Ohio 44216

Continuation of Ser. No. 530,881, Dec. 9, 1974, abandoned. This application Jan. 23, 1976, Ser. No. 651,845

Int. Cl.² B23P *19/04*

U.S. Cl. 29—265 **11 Claims**



1. A tool as for forcibly releasing a frozen brake piston, provided with a cylindrical inner wall portion, from a cylindrical cavity of a disc brake caliper or like work part, said tool comprising: an elongated rigid shank having outer and inner end parts; said shank having a camming tool head, screw-threaded on the inner end thereof, for axially centered reception of said camming tool head within the cavity of the piston, and said camming tool head having a radially outwardly presented conical cam surface adapted to define an annular space between said conical surface and said cylindrical inner wall portion of the piston; a plurality of separate tool head segments each having peripherally arcuate outer wall portions adapted for complemental gripping engagement with said cylindrical inner wall portion of the brake piston, and each said tool head segment also having axially tapered, peripherally arcuate inner surface areas for complemental sliding engagement with said outwardly presented conical surface of said camming tool head; said shank having a first stop means axially inwardly adjustable thereon against said camming tool head segments, to slide the segments on said conical cam surface of the camming tool head, axially to adjust said camming tool head segments radially outwardly into direct clamping engagement of said peripherally arcuate outer wall portions of the segments with the cylindrical inner wall portion of the piston; a second stop means axially adjustably mounted on said shank, axially outwardly of said first stop means, for axial adjustment of said second stop means against a relatively fixed portion on the work part, whereby said rigid shank is thereby urged axially outwardly of said caliper with said clamped piston thereon, to release and withdraw and piston from the cylindrical inner wall portion of the work part.

4,009,516

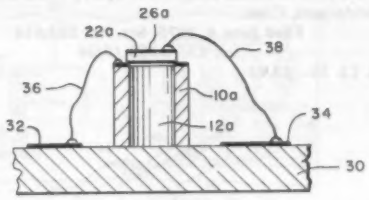
PYROELECTRIC DETECTOR FABRICATION

Alice M. Chiang, Framingham; Brian W. Denley, Melrose, and Richard L. Schapker, North Andover, all of Mass., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Mar. 29, 1976, Ser. No. 671,913

Int. Cl.² H01L *37/00*

U.S. Cl. 29—592 **21 Claims**



1. A method of fabricating a pyroelectric detector, the method comprising:

providing a substrate of a first material, the substrate having first and second surfaces and a cavity therein;

mounting a pyroelectric body on the first surface of the substrate with a first portion of the body in contact with the substrate and a second portion extending over the cavity;

filling the cavity with a second material; processing the pyroelectric body, after filling the cavity, to form a pyroelectric detector; and

removing the second material from the cavity after processing the pyroelectric body.

4,009,517

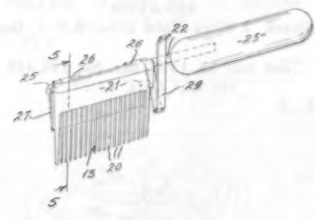
BARBERING TOOL

Robert E. Horn, 4866 Viento Drive, St. Louis, Mo. 63129

Division of Ser. No. 351,422, April 16, 1973, Pat. No. 3,919,769. This application Nov. 5, 1975, Ser. No. 629,025

Int. Cl.² B26B *21/12*

U.S. Cl. 30—30 **1 Claim**



1. A barbering tool comprising a cutting blade element and a comb element disposed in substantially parallel relation with each other, said comb element having teeth projecting beyond the cutting edge of said blade element, said blade and comb elements being held against movement lengthwise of said blade and lengthwise of said teeth with respect to each other, one of said elements having a shank extending parallel to the cutting edge, an elongated handle rigidly mounting said shank

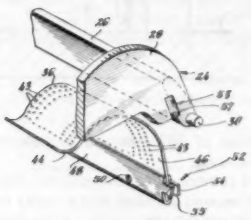
for simultaneous movement of both said blade and comb elements through a person's hair, and means for selectively varying the spacing of the cutting edge of said blade element from said comb element transversely of the plane of said blade element comprising hinge means along two adjacent edges of said comb and blade elements, and an elongated finger piece fixed to said blade element adjacent to said handle and extending transversely of said hinge means whereby to permit the user of the tool to adjust said blade element during use by finger pressure on a selected end portion of said finger piece without releasing his grip on said handle.

4,009,518

ELECTRIC DRY SHAVER HAVING FLEXIBLE FOIL TYPE OUTER CUTTER

David R. Locke, Bridgeport, and Edward Szymansky, Fairfield, both of Conn., assignors to Sperry Rand Corporation, Bridgeport, Conn.

Filed June 4, 1975, Ser. No. 583,618
Int. Cl.² B26B *19/04*
U.S. Cl. 30—43.92 **5 Claims**



1. An outer cutter assembly for an electric dry shaver comprising,

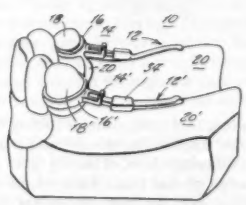
a. a frame member having slots therein,
b. a flexible foil outer cutter having oppositely disposed marginal portions,
c. elongated U-shaped bars clamped to a pair of said marginal portions for stiffening said pair of marginal portions,
d. tabs formed on said bars extending from opposed ends thereof, and
e. resilient spaced leg members formed on at least one of said bars and biased against wall portions of said frame member slots for interlocking the foil outer cutter to the frame member.

4,009,519

ADJUSTABLE DISTAL EXTENSION HINGED STRESS BREAKER

Ralph Hallmark, 2 Brick Yard Drive R.R 1, Hudson, N.H. 03051

Filed July 23, 1975, Ser. No. 598,416
Int. Cl.² A61C *13/22*
U.S. Cl. 32—5 **7 Claims**



1. A distal extension hinged stress breaker for a dental appliance comprising;

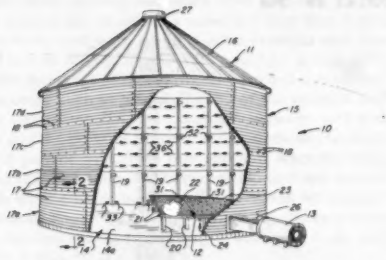
a. a head portion adapted to be coupled to an attachment which connects onto existing teeth;
b. a substantially longitudinal shank portion;
c. pivot means pivotally coupling one end of said shank portion to said head portion to permit rotational movement therebetween;
d. a rear portion enclosing the opposite end of said shank portion and adapted to be coupled to a base which fits over the mouth ridges and support artificial teeth; and
e. retention means extending from said head means and holding said shank means for preventing lateral movement of the shank means with respect to the head means,
f. wherein said head portion is a U-shaped member and said retention means are free deformable ends extending from said head portion,
g. further comprising stop means positioned on said head portion for restricting said rotational movement to only one direction from an initial rest position,
h. and wherein said stop means includes arms coupled to the ends of said extensions and facing towards each other with a space therebetween, said arms positioned to lie above said shank portion.

4,009,520

GRAIN DRYING SYSTEMS

Eugene G. Sukup, Dougherty, Iowa 50433

Filed July 21, 1975, Ser. No. 597,362
Int. Cl.² F26B *19/00*
U.S. Cl. 34—233 **9 Claims**



1. In a grain bin having a foundation including a bottom floor, a noninsulated wall supported on said foundation, a perforated subfloor spaced above said bottom floor and forming a chamber between said floors, and means for forcing dry air into said chamber;

means for preventing condensation from forming on the interior surface of said wall and for reinforcing said wall comprising:

a plurality of upright rigid hollow conduit members positioned about the interior of the bin wall in arcuately spaced relation to one another;

each of said conduit members resting at its lower end on said foundation;

means providing fluid communication between the hollow interior of each of said conduit members and said chamber when said conduit members are resting on said foundation;

each of said conduit members having a closed upper end;

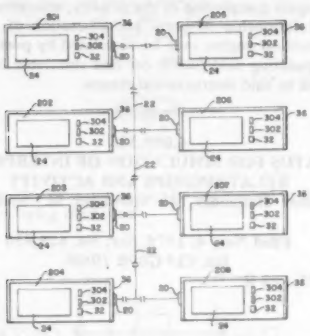
each of said conduit members having a plurality of spaced air diffusing perforations formed therein, a predetermined number of which direct air flow laterally along said bin wall; and

said conduit members being secured in reinforcing relation to the interior of said bin walls and with said lower ends resting on said foundation whereby said conduit members provide reinforcement and load bearing support for said wall.

4,009,521
INTERCONNECTED RESPONSE RECORDING AND DISPLAY CONSOLES

John E. King, Fairport, and Herbert W. Watkins, Pittsford, both of N.Y., assignors to The Singer Company, New York, N.Y.

Filed Aug. 20, 1975, Ser. No. 606,038
Int. Cl.² G09B *5/00*
U.S. Cl. 35—8 R **18 Claims**



1. An apparatus for the selective transmitting and receiving of responses between a plurality of console operators comprising:

a plurality of response recording and display consoles; electrical interconnection means operably coupling the console;

each console including a plurality of electrical switches each having a plurality of stable states including a response recording state and a non-response recording state;

each console including a plurality of response indicating lamps;

each lamp on a console operably associated through electrical circuitry with a corresponding one of the switches on the console whereby actuation of a switch to the response recording state causes the corresponding one of the lamps on the console to illuminate;

each lamp operably associated through the electrical circuitry and the interconnection means with a corresponding one of the lamps on each of the other consoles;

each console including a console operator actuatable transmit switch interposed in the electrical circuitry adapted to simultaneously reversibly couple all illuminated lamps on a console with the corresponding lamps on each of the other consoles; and

each console including a console operator actuatable receive switch interposed in the electrical circuitry adapted to simultaneously reversibly de-couple all lamps on a console with the corresponding illuminated lamps on each of the other consoles.

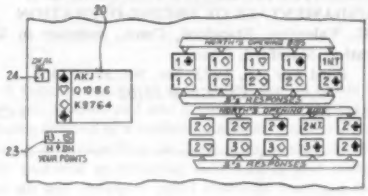
4,009,522
DEVICE FOR THE TEACHING AND/OR TRAINING IN THE GAME OF BRIDGE

Henri Marie Léon Borianne, 10 avenue de Wagram, 75008 Paris, France

Filed Oct. 28, 1975, Ser. No. 626,047
Claims priority, application France, Oct. 31, 1974, 74.36417
Int. Cl.² G09B *19/22*
U.S. Cl. 35—8 B **18 Claims**

15. A device for teaching or practicing bidding for the card game of bridge, which comprises:

at least one printed support means, associated with and movable along a fixed path of travel relative to a masking means, said support means bearing non-overlapping columns of information relative to bidding of a player's hand along the path of travel, said information being printed along lines orthogonal to the path of travel of said support means, said columns of said support means including a first column having lines of printed symbols representing the value of a selected number of cards of the same suit, said first column including at least one series of more than four said lines which are sequentially arranged so that the number of cards represented by any four successive lines of said at least one series equals a full hand of thirteen cards, and said support means also including at least one other column having lines of printed symbols, each line representing a bid by the player for a corresponding group of four lines of said at least one series, in which the suit of each line is determined by the position of said support means relative to said masking means; and



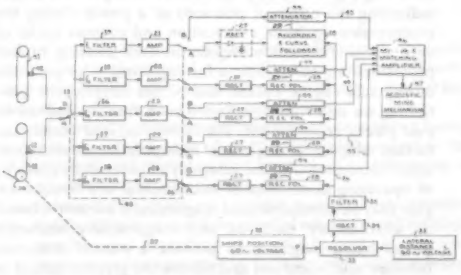
said masking means, which include a large window corresponding to said first column of said support means, which is adapted in size and relative position to permit the appearance therein of exactly for lines of said first column of said support means, so that as said support means is moved to its next position, at least two of the four lines are preserved within said large window, said masking means having

four symbols representing the four card suits printed along a side of said large window so that each suit symbol is adjacent one of the four lines of said first column of said support means within said large window, said masking means also including at least one other window corresponding to said at least one other column of said support means, within which appears said bid by the player for the hand appearing simultaneously within said large window.

4,009,523
ACOUSTIC SIGNATURE SIMULATION

Jack K. Van Hook, Orlando, Fla., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 15, 1958, Ser. No. 780,638
Int. Cl.² G08B *3/00*
U.S. Cl. 35—10.4 **3 Claims**



1. The method of producing an electric signal corresponding to the underwater acoustic signature which would be

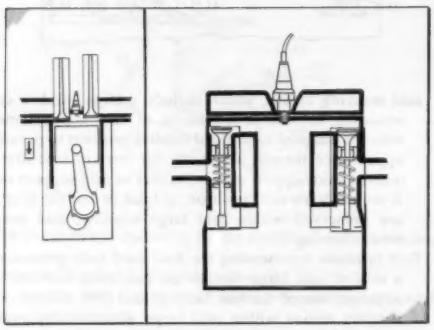
generated by the movement of a certain sound source through a remote underwater environment which comprises preparing a recording at a substantially constant signal level of the acoustic output of said certain sound source in deep water far from shore, preparing a series of curves of the transmission characteristics of said remote environment for sound in selected consecutive frequency bands as a function of distance from said source, reproducing the constant level recording as electrical waves, separating the reproduced electrical waves into said selected consecutive frequency bands, modulating the amplitude of the electrical waves in each frequency band in accordance with the corresponding sound transmission characteristic curve, and combining the modulated electrical waves.

4,009,524

EDUCATIONAL DEVICE FOR LEARNING FUNDAMENTALS OF ENGINE OPERATION

Charles G. Valentine, Stamford, Conn., assignor to Xerox Corporation, Stamford, Conn.

Filed Apr. 19, 1973, Ser. No. 352,774
Int. Cl.² G09B *25/02*
U.S. Cl. 35—13 **6 Claims**



1. An educational kit programmed for teaching the internal combustion engine comprising as integrated component parts thereof:

a. a simulator board having a surface of magnetically attractive material and having graphic indicia on the surface thereof including schematic sectional views of the cylinder portion of the internal combustion engine, the graphic indicia on said simulator board being the non-numerical board indicia as shown in FIG. 1;

b. a plurality of magnetically attractive manipulative pieces individually bearing on their surfaces specific graphic indicia defining parts for said internal combustion engine including pistons, valves, and shafts and gears, said pieces including a plurality of pieces each bearing piston indicia indicating the different positions of a piston during the compression, ignition, combustion and exhaust cycles of an internal combustion engine, another plurality of said pieces bearing valve indicia for depicting valve positions during said engine cycles, said pieces adapted for positioning on said simulator board such that the indicia on said pieces complements the indicia on said board, and further adapted for sequential manipulation on said simulator board such that the assembly of parts and a plurality of operating conditions of said internal combustion engine may be simulated; said magnetically attractive board or alternatively each of said magnetically attractive pieces being magnetic to provide a mutual attraction between said board and said pieces, the graphic indicia on said manipulative pieces being the non-numerical piece indicia as shown in FIG. 3; and

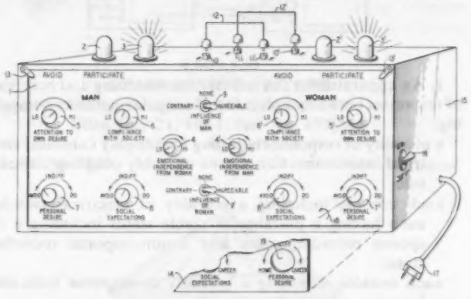
c. audio-visual instructional means including synchronized recordings and visual slides or filmstrips presenting information relevant to the internal combustion engine including information defining the relationship between the indicia on said pieces and the indicia on said simulator board; said audio-visual instructional means further characterized in that it is periodically stopable to permit the user to perform a manipulative activity requested by the instructional means using said simulator board and said manipulative pieces, and being restartable again by the user upon completion of the activity; whereby the assembly, relationship of parts and operation of an internal combustion engine may be simulated by positioning and manipulating said pieces on said simulator board in response to said instructional means.

4,009,525

APPARATUS FOR SIMULATION OF INTERPERSONAL RELATIONSHIPS AND ACTIVITY

James Fisher Hollander, 40 Middlesex St., Matawan, N.J. 07747

Filed Nov. 4, 1975, Ser. No. 628,830
Int. Cl.² G09B *19/00*
U.S. Cl. 35—22 R **45 Claims**



45. Interpersonal relationship simulator apparatus comprising

a first decisionmaking simulation apparatus adjustably indicating levels of one or more decisional influences upon a first simulated individual and displaying simulated decisions resulting from an action of forces in said first apparatus corresponding to said first decisional influences, a physical decision output being available from said first apparatus; and

a second decisionmaking simulation apparatus adjustably indicating levels of one or more decisional influences upon a second simulated individual and displaying second simulated decisions, said physical decision output from said first apparatus causing an influence on said second apparatus in analogy with a decisional influence upon said second simulated individual, said second simulated decisions resulting from an action of forces in said second apparatus corresponding to said second decisional influences, whereby the simulation of interpersonal relationships is facilitated.

4,009,526

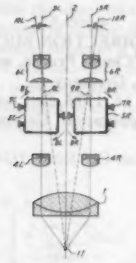
BINOMIAL MICROSCOPE

Kuniomi Abe, Kobe, and Yuji Maekawa, Nishinomiya, both of Japan, assignors to Konan Camera Research Institute, Japan

Filed Sept. 30, 1975, Ser. No. 618,278
Claims priority, application Japan, Apr. 24, 1975, 50-56683
Int. Cl.² G02B *21/22*
U.S. Cl. 350—35 **1 Claim**

1. A binomial microscope comprising an auxiliary objective and a pair of optical systems having substantially parallel optical axes and being arranged in the rear of said auxiliary objective, each of said optical systems including an objective, an erect prism and an ocular, and said optical system further

includes means for moving at least a part of said erect prism while the remaining optical components remain fixed,



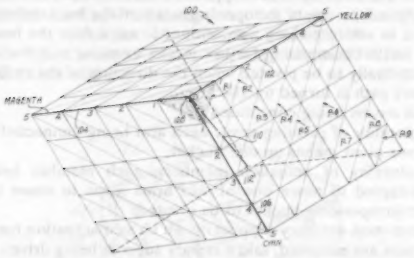
whereby the observed image can be positioned in the vicinity of the object being observed.

4,009,527

COORDINATED COLOR CHART SYSTEM, AND METHOD FOR PRODUCING SAME

Camilla Ann Scott, Reston, Va., and Elizabeth L. Zimmerman, Washington, D.C., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Nov. 6, 1975, Ser. No. 629,270
Int. Cl.² G09B *19/00*
U.S. Cl. 35—28.3 **3 Claims**



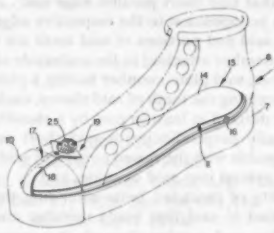
1. A color chart displaying a plurality of coordinated distinct colors, each coordinated color on said chart being obtained by utilizing specific amounts of each of only independently variable, constant tint density colorants yellow, magenta, and cyan, and being represented by a specific point in a plane disposed perpendicular to a line drawn between one point and another point diagonally opposite thereto within the space of a color cube on which said colorants are arranged along three mutually perpendicular edges of said cube mutually intersecting at said one point, one of said colorants corresponding to each edge with the amount of each colorant uniformly and progressively increasing along its respective edge from a minimum at said one point to a maximum at corresponding cube corners, and wherein there is associated with each said specific point on said plane a unique combination of amounts of each said colorants which is characterized by a constant tint density.

4,009,528

SNEAKER WITH INSOLE

John J. Villari, Jr., 30 W. Central Ave., East Bangor, Pa. 18013, and Charles Paraschos, P.O. Box 458, Portland, Pa. 18351

Filed Mar. 2, 1976, Ser. No. 663,067
Int. Cl.² A43B *13/38*
U.S. Cl. 36—44 **6 Claims**



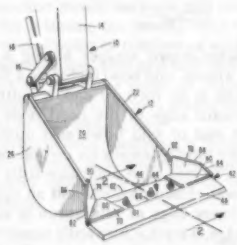
1. A sneaker or canvas shoe containing an insole including a foot sole-shaped pad and a casing enclosing said pad, said pad being formed of a resilient cushioning material capable of receiving and expelling air, two edge sealed sheets of thin elastic material constituting said casing and comprising a sealed air and moisture proof envelope having a main body portion of a shape and size to conformably enclose said pad and an appendage extending from the toe end of the main body portion to receive and entrap air expelled from the pad enclosing main body portion when pressure is applied to the insole for compressing the pad and collapsing the casing portion enclosing the pad.

4,009,529

GRADING BLADE FOR A TOOTHED SHOVEL

Lawrence M. Johnson, 3594 S. Sand Creek Road, Decatur, Ill. 62521

Filed Sept. 25, 1975, Ser. No. 616,657
Int. Cl.² E02F *3/76, 3/81*
U.S. Cl. 37—117.5 **4 Claims**



1. A grading blade attachment for a backhoe shovel or the like having a plurality of outwardly extending spaced teeth, each of said teeth having a raised portion on the upper surface thereof, said blade attachment comprising:

a substantially planar trapezoidal first blade member having a short parallel edge of width substantially equal to the width of said shovel, a long parallel edge, and a pair of opposed converging side edges,

a substantially planar rectangular second blade member rigidly affixed to said long parallel edge of said first blade member and extending outwardly thereof, said second blade member terminating in a scraping edge substantially parallel to said parallel edges,

a pair of upstanding side portions, one of said side portions being attached to said first blade member along each of

said nonparallel edges and extending upwardly substantially perpendicular to said first blade member,

means for attachment of said blade attachment to said shovel without modification of said shovel consisting essentially of,

a clamping member attached to the underside of said second blade member to define therebetween an opening for receiving the end portions of said teeth, said clamping member being so located as to position said attachment such that said short parallel edge and said side portions are in juxtaposition to the respective edges of said shovel when said end portions of said teeth are in said opening,

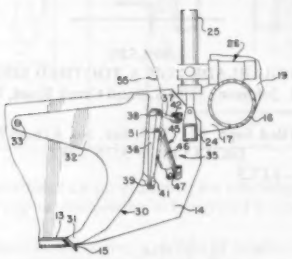
a plate member attached to the underside of said first blade member, said plate member having a plurality of notches for receiving the teeth of said shovel, each of said notches being defined at least in part by a shoulder oriented substantially perpendicular to said short parallel edge and engageable with the raised portion of said teeth when said teeth extend into said opening, and

a plurality of threaded bolts extending through the holes provided in said first blade member and said clamping member and passing through the spaces between said teeth, said bolts being secured by nuts installed thereon to fasten said grading blade attachment to said shovel.

4,009,530
APRON LIFT LINKAGE

Larry G. Eftefield, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Apr. 9, 1976, Ser. No. 675,361
Int. Cl.² E02F 3/75
U.S. Cl. 37—126 AD **6 Claims**



1. In a tractor-drawn scraper having a bowl rearwardly supported by wheels, said bowl including a floor and sidewalls, and being open at its forward end, a cutting edge disposed along the forward edge of the bowl floor, an apron at the forward open end of said bowl, said apron being pivotally mounted on the bowl sidewalls for pivotal movement about an axis transverse to said bowl and rearwardly of said apron and between a lower closed position and an upper open position wherein the lower edge of said apron is substantially above said cutting edge, a tractor forwardly supported by wheels and having draft arms extending rearwardly thereof to pivotal connections on the bowl sidewalls, hydraulic lift jack means connected between the rear of said tractor and the front of said bowl for raising and lowering the front of said bowl, the improvement comprising:

first and second links, one end of said first link being articulately connected with one end of said second link;

means articulately connecting the other end of said first link to the center of said apron;

means articulately connecting the other end of said second link to one of said sidewalls of said bowl forwardly of said apron;

a hydraulic jack having a cylinder and an axially movable rod extending from said cylinder;

means for articulately connecting one end of said hydraulic jack to one of said links near said one end thereof; and

means articulately connecting the other end of said hydraulic jack to said one sidewall of said bowl at a position vertically spaced from the other end of said second link.

4,009,531
REVERSIBLE DIRECTION BUCKET WHEELS

Michel Metrier, Saint Cloud, France, assignor to Koch Transporttechnik GmbH, Germany

Filed Oct. 14, 1975, Ser. No. 622,414
Claims priority, application Germany, May 22, 1975, 2522562
Int. Cl.² E02F 3/24
U.S. Cl. 37—189 **4 Claims**

1. An apparatus for picking up bulk products, particularly granular or pulverulent products from a heap, of the type constituted by a plurality of buckets mounted on an endless mobile support, such as a bucket wheel, wherein the mobile support comprises a driving device allowing said mobile support to be driven in two opposite directions, each bucket comprising a pivot means having a pivoting axis transverse with respect to the path of the mobile support, and means defining first and second pick up openings, each opening means being capable of being placed in a picking up and active position substantially perpendicular with respect to the path of the mobile support, and facing a direction opposite to the direction faced by the other bucket opening means when in active position, thus permitting the mobile support to be moved alternatively in two opposite directions each of which corresponds to one of the opening means of the buckets being placed in active picking up position, so as to face the heap, each bucket comprising further means to cause said bucket automatically to be pivoted when the direction of the mobile support path is turned by 180°;

said means being constituted by:

a plurality of pivoting arms, each arm being connected to one pivot means on one bucket;

a plurality of actuation members, each member being adapted to move one of said arms so as to cause the corresponding bucket to be pivoted;

a common auxiliary support on which said actuation members are mounted, said auxiliary support being driven by the driving device of the apparatus, and in the same direction with respect to the direction of the mobile support of the buckets, the displacement of said auxiliary support compared with said mobile support of the buckets causing the pivoting arms to be angularly moved and the bucket to be pivoted, so as to place one bucket opening in active position facing the heap towards which the mobile support is moved.

4,009,532
ADJUSTABLE DISPLAY STANDARD

Wayne A. Thomas, 200 N. Van Ness, Los Angeles, Calif. 90004

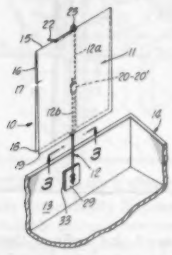
Filed Oct. 31, 1975, Ser. No. 627,549
Int. Cl.² G09F 3/14
U.S. Cl. 40—11 A **8 Claims**

1. A display standard, comprising:

a. an elevated sheet-like display member folded upon itself

along a fold line to provide a top folded edge and at least one facing panel having a lower edge;

b. a tab member centrally carried by said lower edge of said panel, said tab being releasably attachable to the rod-like structure to stabilize the sheet-like member as supported by said rod-like structure against tilting movements, said tab having an opening adjacent a projecting end thereof of a size to receive said rod-like structure, and an end slit extending radially outwardly from said opening to enable relative lateral movement of the rod-like structure into a gripped position in said opening;



c. a first elongated rod-like element having one end formed to releasably engage a top portion of said display member;

d. a second elongated rod-like element having means at one end for attachment to an associated object; and

e. a tubular member for adjustably interconnecting and frictionally retaining the respective other ends of said elements in overlapped parallel relation to form an upright support for and extending below the display member, and a support having an axial length adjustment to vary the spacing distance between said attachment means and the elevated position of the display member.

4,009,533

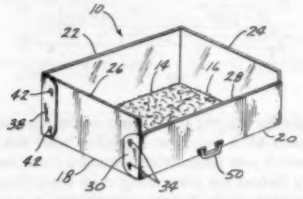
SAMPLE ENLARGING MATERIAL DISPLAY DEVICE

John M. Larkin, 6304 Colby Ave., Des Moines, Iowa 50311

Filed Jan. 19, 1976, Ser. No. 650,144

Int. Cl.² G09F *11/00, 13/14, 19/16;* **B65D** *7/28*

U.S. Cl. 40—28 B **10 Claims**



1. A device for displaying a sheet of material comprising;

a floor wall having perimetric edges in a rectangular shape;

an upstanding wall extending upwardly from each of said perimetric edges and being hinged thereto for pivotal movement about an axis approximately coincident with said perimetric edge from an upstanding position to a folded position in facing relation to said floor wall;

said upstanding walls having adjoining vertical edges when in said upstanding position so as to close said floor wall in a rectangular configuration having an open upper end;

securing means connected to at least some of said vertical edges of said upstanding walls, said securing means being adapted to retentively engage the adjoining upstanding wall when said upstanding walls are in their upstanding position, and being adapted to retentively engage said floor wall when said upstanding walls are in their folded position;

said upstanding walls having mirror surfaces on their inwardly presented sides so that a viewer looking through said open upper end will see the illusion that said upper surface of said floor wall extends infinitely, said mirrored surfaces facing inwardly toward said bottom wall when in said folded position.

4,009,534

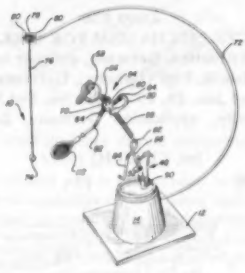
KINETIC SCULPTURE

Gordon E. Bradt, Kinetico Center, Busch, Ark. 72620

Filed Dec. 17, 1975, Ser. No. 641,616

Int. Cl.² G09F *19/08*

U.S. Cl. 40—106.3 **16 Claims**



1. A kinetic sculpture, comprising:

a base adapted for positioning on a support surface, such as a table or the like;

a rotatable drive means mounted on said base;

an outwardly extending object mounted on said base and operatively connected with said drive means for rotation thereby in a given direction;

releasable connection means between said object and said drive means for releasing the driving force therebetween at a predetermined point of rotation of said object;

biasing means between said base and said object for returning the object to an initial point of rotation whereby continuous operation of said drive means effects oscillating movement of said object; and

said rotatable drive means including a rotatable tubular drive member having a substantially open irregularly shaped periphery defining a portion of the releasable connection means.

4,009,535

ILLUMINATED HOUSE NUMBER SIGN

William Stock, 172 High Park Ave., Ontario, Canada

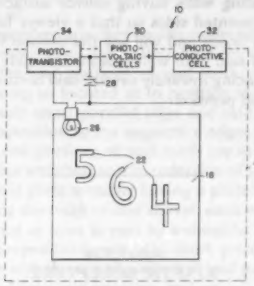
Filed Oct. 1, 1975, Ser. No. 618,316

Int. Cl.² G09F *13/00*

U.S. Cl. 40—130 K **2 Claims**

1. A self contained illuminated house number sign which stores solar energy in daylight and utilizes the stored energy for night illumination comprising photovoltaic cell means, battery means, photoconductive cell means for coupling said photovoltaic cell means to said battery means only during

daylight, lamp means, light sensing means for coupling said battery means to said lamp means at night, sign means positioned to be illuminated by said lamp means, and wherein said light sensing means is a photo transistor.



4,009,536

TRIGGER MECHANISM FOR FIREARMS

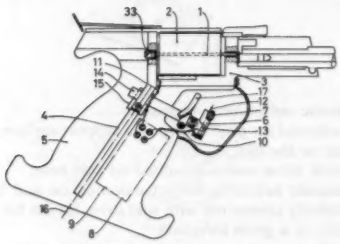
Horst Wolff, Weilstetten, Germany, assignor to Carl Walther Sportwaffenfabrik, Ulm (Danube), Germany

Filed Jan. 29, 1975, Ser. No. 544,971

Claims priority, application Germany, Jan. 29, 1974, 2404053

Int. Cl.² F41C *19/12*

U.S. Cl. 42—84 **19 Claims**



1. A trigger mechanism for firearms comprising a movable firing pin, an electromagnet having a coil and a movable armature actuated by said coil, said coil being cylindrical and comprising an outer surface element around said coil and extending beyond one end thereof, said armature being disc-shaped and disposed within said surface element extension, a pair of diaphragms on the ends of said surface element to close said coil and carrying said firing pin at the centers thereof, said armature drivingly connected to said firing pin to move the same when said coil is energized, and switch means for connecting said coil to a souce of electrical energy to energize said coil.

4,009,537

AUTOMATIC ASTRAGAL

S. Eugene Hubbard, Niles, Mich., assignor to Kawneer Company, Inc., Niles, Mich.

Filed Jan. 30, 1976, Ser. No. 653,924

Int. Cl.² E06B *7/20*

U.S. Cl. 49—319 **11 Claims**

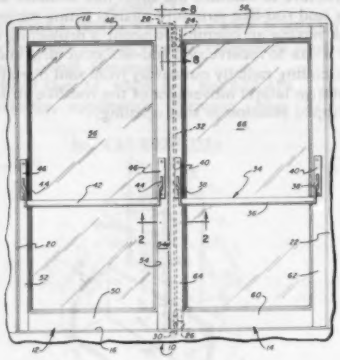
1. An automatic astragal assembly for a door comprising:

an elongated astragal housing mounted on said door and having an outwardly opening longitudinal recess therein,

an elongated astragal mounted in said recess,

means supporting said astragal in said recess for upward and inward relative movement in said housing in response to lifting of said astragal,

means for lifting said astragal in said recess comprising a lift slide mounted on said housing for vertical movement and



having an L-shaped slot defined therein with interconnecting horizontal and vertical sections and a deadlock pin engaged in said slot and secured to said astragal for elevating the same.

4,009,538

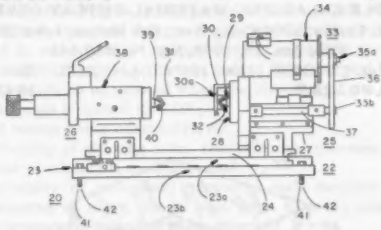
FIXTURE FOR CONVERTING A CENTERLESS GRINDER TO A CENTER GRINDER

John Hanecker, 1958-60 N. Seminary Ave., Chicago, Ill. 60614

Filed Jan. 8, 1975, Ser. No. 539,354

Int. Cl.² B24B *5/04, 41/06*

U.S. Cl. 51—103 C **7 Claims**

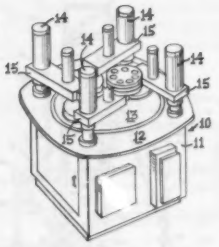


1. In a grinder having a grinding wheel mounted upon a support means of a centerless grinder with the regulating wheel and work rest assemblies removed from such support means and a fixture for converting such centerless grinder to a center grinder such fixture comprising a base member mounted on the support means, a headstock member slidably mounted on such base member having a first center member, a tailstock member slidably mounted on such base member disposed from such headstock member and having a second center member for supporting a work piece effectively through its central axis in co-action with the first center member, said base member being fixedly mounted on the support means of the centerless grinder in the position normally occupied by the work rest and regulating wheel assemblies so that the work piece supported by the first and second center members of the headstock and tailstock members respectively may be brought by movement of the support means into grinding contact with the grinding wheel while such work piece is effectively supported through its central axis by the center members.

4,009,539
LAPPING MACHINE WITH VACUUM WORKHOLDER

Lawrence Day, Mount Prospect, Ill., assignor to Spitfire Tool & Machine Co., Inc., Chicago, Ill.

Filed June 16, 1975, Ser. No. 587,140
Int. Cl.² B24B *37/04*
U.S. Cl. 51—131 **8 Claims**



7. In a lapping machine having a horizontal arm supporting at one end a generally horizontally disposed pressure pad, with the arm and pad rotatable about a horizontal axis, comprising

a. means for connecting the pressure pad to one end of the arm for rotational movement therewith,

b. a removable tray-like member adapted to sit upon said pressure pad,

c. vacuum pressure means applying vacuum pressure through the pressure pad to releasably retain said tray-like member thereon,

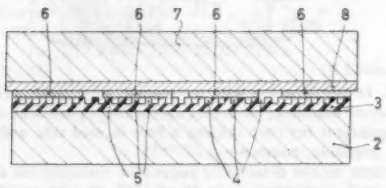
d. means defining a plurality of workpiece-receiving areas formed in one face of said tray-like member, and

e. a porous material extending through said workpiece-receiving areas through which a vacuum is maintained for holding a workpiece within said area and said tray-like member upon the pressure pad during rotation of the arm about said horizontal axis.

4,009,540
METHOD OF WORKING FLAT ARTICLES

Antonius Johannes Mathijs Uijen, Nijmegen, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 25, 1975, Ser. No. 561,938
Claims priority, application Netherlands, Apr. 1, 1974, 7404364
Int. Cl.² B24B *41/00*
U.S. Cl. 51—283 **9 Claims**



1. A method of temporarily holding together facing connection surfaces of a semiconductor wafer and support for working on a surface of the wafer remote from the support, comprising the steps of:

forming in the connection surface of the support at least one recess, said at least one recess being open only at the connection surface and having walls that are gas impermeable;

positioning the connection surface of the semiconductor wafer against the connection surface of the support in a position to cover completely the opening of said at least one recess, thereby forming at least one closed space;

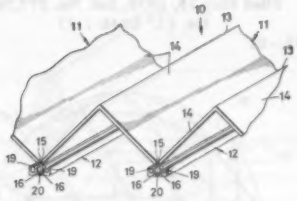
reducing the gas pressure surrounding the support and wafer until subatmospheric gas pressure is produced in said at least one closed space; and

bringing the gas pressure surrounding the support and wafer to atmospheric pressure to trap subatmospheric pressure in said at least one closed space and hold the wafer and support together.

4,009,541
UNDER-ROOF DRAINAGE DEVICE

Kiyoo Yoneya, Kurobe, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 23, 1976, Ser. No. 679,847
Claims priority, application Japan, Apr. 24, 1975, 50-56516[U]
Int. Cl.² E04D *13/00*
U.S. Cl. 52—14 **6 Claims**



1. An under-roof drainage device comprising in combination:

a. a plurality of unit panels of extended length each having a longitudinal central portion dividing said unit panel into a pair of panel sections with oppositely facing free edges, said panel sections each being sloped downwardly from said central portion toward said free edges:

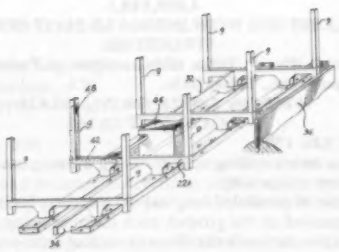
b. a male half member extending donwardly from at least one of said free edges of each of said unit panels, and engaging the male half member of the adjacent unit panel; and

c. at least one gutter means having the same length as the unit panels and including a female member formed centrally on and extending along the length of said gutter means, said engaging male half members detachably interfitting with said female member on said gutter means.

4,009,542
FOOTINGS AND FOUNDATIONS FOR BUILDING

Alvin J. Houston, Dollard des Ormeaux, Canada, assignor to Hutton Developments Ltd., Dollard des Ormeaux, Canada

Filed Feb. 25, 1976, Ser. No. 661,448
Int. Cl.² E04B *1/34;* **E02D** *27/32*
U.S. Cl. 52—73 **8 Claims**



1. A housing unit comprising at least a pair of elongated footing members, spaced-apart and parallel, extending in one direction of a building, a plurality of spaced-apart beam mem-

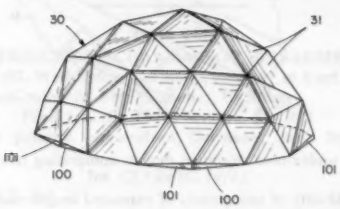
bers supported directly on said footings, the beam members extending parallel to each other and at right angles to the footings, the beam members extending in cantilevered fashion beyond the edges of the footings and defining the longitudinal edges of the housing unit to be supported, longitudinal beams extending in cantilevered fashion at right angles to the first beams to determine the lateral edges of the housing unit, load-supporting uprights provided on the cantilevered beams for supporting the load of said housing unit; the cantilevered beams and uprights being provided with integral communicating ducts which may be used for circulating heating or air-conditioning air throughout the housing unit.

4,009,543

GEODESIC DOME

Thomas J. Smrt, 31W 300 W. Bartlett Road, Bartlett, Ill. 60103

Filed May 15, 1975, Ser. No. 577,762
Int. Cl.² E04B *1/32*
U.S. Cl. 52—81 **3 Claims**



1. A geodesic dome formed from a plurality of structural triangles, each triangle having three apices, three struts joined together at the apices, and a panel member secured to the struts and covering the area within the struts, each strut having a hollow rectangular cross section and a flange portion positioned on the outside of the triangle, the flange portion of each strut of each triangle being secured to a flange portion of an adjacent strut, a generally V-shaped reinforcing member positioned within each strut, each triangle including three V-shaped connectors and a corner extension at each end of each strut, each corner extension being generally channel-shaped in cross section and having a pair of end portions, one of the end portions being received within one of the hollow struts and having a pair of inclined inner surfaces mating with the V-shaped reinforcing member, each connector having a pair of legs which are received by two adjacent struts of the triangle at one of the apices of the triangle, each leg including a downwardly extending tab, each connector including a transverse wall abutting the tab of the associated connector and restraining outward movement of the connector from the strut.

4,009,544

DRILLING RIG WITH IMPROVED MAST SUPPORT STRUCTURE

Theodore B. Houck, Tulsa, Okla., assignor to Parker Drilling Company, Inc., Tulsa, Okla.

Filed July 7, 1975, Ser. No. 593,635
Int. Cl.² E04H *12/34*
U.S. Cl. 52—120 **4 Claims**

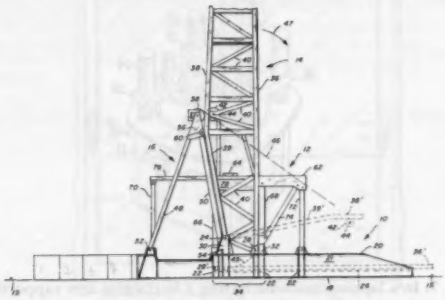
1. In a rotary drilling system having a tilting mast, the improvement comprising:

a. a pair of paralleled longitudinal members forming a base supported on the ground, each member being fabricated as a box section in the shape in vertical cross-section of an open top U;

b. four pairs of paralleled spaced vertical support plates centered over and affixed to said U members and rising above the tops of said U members;

c. a mast having two front and two rear corner columns, arranged in a rectangular horizontal cross-section, the lower end of each of said columns being pinned to a said pair of support plates and centered over said U-shaped members; and

d. means to tilt said mast forward about a horizontal axis through the pins in said rear columns;



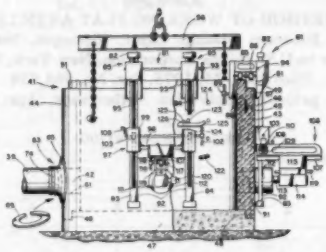
whereby as said mast tilts forward the lower portion of the front columns will be received within said U-shaped stiffening members so that when the mast is horizontal the front columns are at a height above the ground less than the height of the top of said longitudinal members.

4,009,545

APPARATUS FOR PIPE-TO-MANHOLE SEALING

John C. Rossborough, Amherst, N.H., assignor to Merchants National Bank of Manchester, Manchester, N.H.

Continuation of Ser. No. 374,029, June 26, 1973, abandoned, Division of Ser. No. 257,703, May 30, 1972, abandoned. This application Sept. 25, 1975, Ser. No. 616,862
Int. Cl.² E21C *11/00*
U.S. Cl. 52—173 R **7 Claims**



1. In combination with a pre-cast, wire mesh, reinforced concrete manhole, having an upstanding cylindrical side wall, apparatus for core drilling a hole in said side wall of said manhole, comprising:

frame means detachably supported vertically on a face of said upstanding cylindrical wall of said manhole, by clamp means tightened on the upper rim thereof;

said frame means comprising a pair of spaced-apart parallel posts, each having a clamp bracket proximate the upper end thereof, each clamp bracket having rollers therewithin for riding on the rim of a manhole;

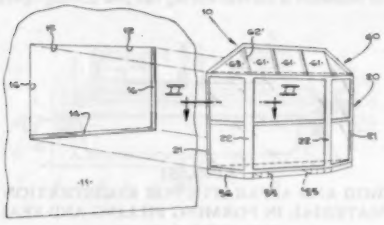
carriage means movable vertically on said frame means;

said carriage means comprising a carriage extending between said posts and having an integral sleeve at each opposite side thereof slidable on one of said posts;

cutter track means movable horizontally on said carriage means,

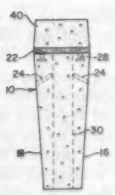
and a cutter movable on said cutter track means in a path normal to the side wall of said manhole for cutting a port hole therethrough.

4,009,546
PRE-ASSEMBLED UNITARY BAY WINDOW CONSTRUCTION
Elwood W. Buck, Jr., Pasadena, Calif., assignor to D G Shelter Products Company, City of Industry, Calif.
Filed Oct. 1, 1975, Ser. No. 618,518
Int. Cl.² E06B *1/38*
U.S. Cl. 52—201 **2 Claims**



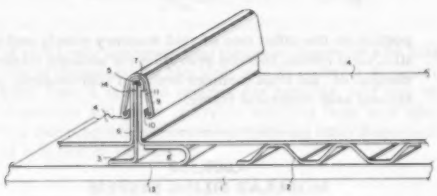
1. A window-counter construction comprising:
a pre-assembled unitary window means having a plurality of window frames positioned in angular relation;
each of said window frames including a sill member, a head member, and vertical side members;
adjacent side members of adjacent window frames being interconnected by a vertical jamb member;
exterior side members of said window frames including a vertically extending flange;
and peripheral frame means including top and bottom plate members secured to said frames and said intermediate jamb members, and side frame members secured to said flanges on said exterior side window frame members;
the interior edges of said top and bottom plate members and peripheral side frame members lying in a planar zone adapted to correspond to the planar zone of a framed opening in a building wall;
roof means covering said top plate member and having edges lying in said planare zone for abutting contact against an exterior surface of a wall;
and counter surface means interiorly of said peripheral frame means and extending over said bottom plate member to said window frames for providing a counter surface extension into said window means.

4,009,547
PRECAST MONUMENT BASE
Clarence Francis Hood, Fairview, Pa., assignor to Top Roc Precast Corporation, Erie, Pa.
Filed Dec. 10, 1975, Ser. No. 639,300
Int. Cl.² E04C *2/04*; E02D *27/00*
U.S. Cl. 52—294 **5 Claims**



1. A precast monument base comprising,
a precast concrete base member having considerable depth to extend well below the frost line when inserted into the ground; said base having a substantially large flat top surface,
a relatively thick closed-cell resilient foam layer secured to and substantially covering at least the periphery of the top surface of the base member,
a substantially rectangular-shaped base cap resiliently positioned on top of the foam layer in operative alignment with the base member, and
adjusting means positioned between the base cap and the base member to adjust the level alignment of and adjustably connect the base cap with respect to the base member while the foam layer effects a resilient mounting relationship therebetween.

4,009,548
ROOF CONSTRUCTION
Clarence R. Hicks, Greeneville, Tenn., assignor to Ball Corporation, Muncie, Ind.
Filed Sept. 30, 1975, Ser. No. 618,120
Int. Cl.² E04C *1/34*; F16B *1/00*
U.S. Cl. 52—469 **2 Claims**



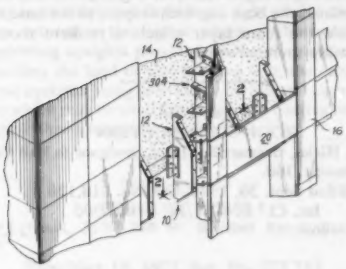
1. A metal covering for a roof deck which comprises:
a. a spaced parallel array of corrugated pan supports, fastened to the deck;
b. standoff support strips placed substantially centered therebetween and fastened to the deck, said standoff strips consisting of a base, a vertical member and a horizontal member spaced above the base;
c. roof pans which lay on the corrugated pan supports and the horizontal member of the standoff supports in abutting relationship to the vertical member of the standoff support strip, abutting portions of the said roof pans consisting of an upturned edge on one side and an upturned edge with a downturned flange on the opposite side; the downturned flange being placed over the vertical member of the standoff support and the abutting upturned edge of the adjoining roof pan;
d. the seam consisting of three pieces, the upturned edge of a roof pan, the vertical member of the standoff support, and the upturned edge of the adjacent roof pan, being dimple punched on alternating sides along the length of the seam; and
e. a two-piece cap forced over the dimple punched seam, said cap comprising an inverted V-shaped portion with inwardly inverted sides and an insert place therewithin, substantially adjoining all of the inner surface of the cap.

4,009,549
STONE STRUCTURAL SECUREMENT SYSTEM AND METHOD
Alfred A. Hala, Islip, N.Y., assignor to Hohmann & Barnard, Inc., Hauppauge, N.Y.
Filed Nov. 25, 1975, Ser. No. 635,099
Int. Cl.² E04B *1/38*
U.S. Cl. 52—506 **54 Claims**

1. A strut member for use in the interconnection of a structural frame and masonry panels of an edifice and comprising
a substantially planar body portion of predetermined geometrical configuration,
a plurality of flange members formed integrally with said body portion and disposed at predetermined edges of said body portion and at predetermined angular orientation with respect thereto,
at least one of said flange members having apertures formed therein for enabling adjustable positional securement of

said flange member to one of said masonry panels and said structural frame, and

said body portion having apertures formed therein for enabling adjustable positional securement of said body



portion to the other one of said masonry panels and said structural frame, thereby providing for secured interconnection of said strut member between said masonry panels and said structural frame.

4,009,550

MODULAR PILING SYSTEM

Frank Edward Young, Abingdon, England, assignor to West's Piling and Construction Company Limited, Great Britain

Filed July 17, 1975, Ser. No. 596,911

Claims priority, application Canada, Dec. 2, 1974, 215085

Int. Cl.² E04C *3/30*; **E02D** *35/00*

U.S. Cl. 52—726 **17 Claims**

1. A pile connecting device, comprising two plates each plate being adapted to be secured to the end of a pile section, each plate having several corners and having a number of recesses extending inwardly from its periphery, there being a recess formed at a selected number of the corners of each plate, each plate having two parallel planar surfaces, one of which is adapted to bear against one of the planar surfaces of the other plate when the plates are brought into abutment, a recess in one plate registering with a corresponding recess in the other plate, and a longitudinal pin substantially uniformly I-shaped in cross-section throughout its length adapted to be inserted and retained in a pair of registering recesses, each pin having opposed ends and including in cross-section a central stem and a head at each end of the stem, the heads and stem of each pin being substantially flush at each end thereof, substantially the entire underfaces of the heads of the pin bearing against the outer planar surfaces of the abutting plates, the pins being uniformly distributed around the periphery of the plates in selected pairs of registering recesses, at least one bar anchored to each plate adjacent to and spaced from each recess, each recess being so constructed and arranged that the associated pin is in relative close alignment with such bar to reduce the deformation of the plate between the bar and the adjacent recess wall and consequent joint failure, and means cooperating in securing the pin in each recess to maintain it therein during the pile driving operation.

4,009,551

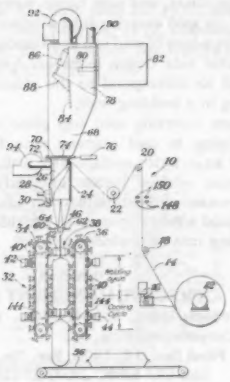
METHOD AND APPARATUS FOR REGISTRATION OF WEB MATERIAL IN FORMING FILLING AND SEALING INDUSTRIAL BAGS

Eddie Lee Greenawalt, and Lorenzo Dow Geren, both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 460,864, April 15, 1974, Pat. No. 3,925,963, which is a continuation-in-part of Ser. No. 347,923, April 4, 1973, abandoned. This application Apr. 28, 1975, Ser. No. 572,582

Int. Cl.² B65B *9/12, 41/18*

U.S. Cl. 53—28 **3 Claims**



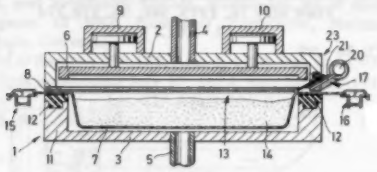
1. In the method generally wherein web material is continuously drawn off a supply roll and converted into a continuously moving tube, simultaneously with the periodic entry of the product into the tube, and the collapsing and transverse sealing of the tube at regular intervals to form therefrom filled bags, the steps to register regularly occurring printed matter on the material with respect to the position of the transverse seals comprising: reading a position that is fixed with respect to the position of the transverse seals, generating a signal responsive to reading the fixed position to activate spaced apart sensing means located in the region between the tube former and the supply roll, decreasing the unwinding tension on the web should the sensor closest to the tube former read a registration mark on the web, increasing the unwinding tension on the web should the sensor farthest from the tube former read the registration mark, and maintaining the unwinding tension on the web static during periods in which such mark floats between such sensors and therefore is not read by either.

4,009,552

DEVICE FOR PACKAGING OF GOODS

Kurt Schlachter, Wallau, Lahn, Germany, assignor to Kramer & Grebe GmbH & Co. KG Maschinen-und Modellfabrik, Wallau, Lahn, Germany

Filed June 23, 1975, Ser. No. 589,701
Claims priority, application Germany, June 25, 1974, 2430497
Int. Cl.² B65B 31/02
U.S. Cl. 53—86 9 Claims



1. In a packaging apparatus having first means for providing a first package member defining a material-receiving cavity, second means for providing a second package member, said first and second package members being in overlying relation to each other and third means for effecting a sealing of said first package member to said second package member, the improvement comprising:

evacuation chamber means comprising first and second chamber halves supported for movement away from each other to an opened position and toward and into sealing engagement with each other and a closed position;

nozzle means mounted on at least one side of said evacuation chamber means and to one of said first and second chamber halves;

means defining a spacing between said first and second chamber halves when in said opened position for receiving one of said first and second package members therebetween and into said evacuation chamber means;

passageway means between said nozzle means and said one of said first and second chamber halves for receiving the other of said first and second package members therein and into said evacuation chamber means; and

sealing means in said passageway means for effecting a sealing engagement of said other of said first and second package members to said one of said first and second chamber means and said nozzle means in response to a sealing engagement between said first and second chamber halves with each other in said closed position.

4,009,553

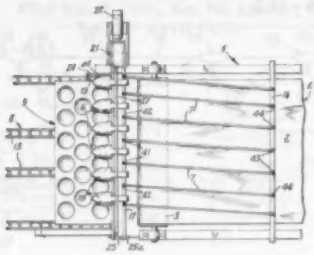
MACHINE FOR FILLING POCKETS

Jacques Yves Monjo, "Gueyrosse", 33350 Ste-Terre, France

Filed Feb. 7, 1975, Ser. No. 547,976
Claims priority, application France, Feb. 7, 1974, 74.04751
Int. Cl.² B65B 5/08, 5/10, 35/30
U.S. Cl. 53—160 8 Claims

1. In an automatic machine for filling pocketed trays with articles, said machine comprising an upper conveyor mounted on a framework to travel between an input point and an output point, a row of dispensers extending transversely of said conveyor at said output point, separating guides mounted on said framework longitudinally of and above said conveyor for directing said articles into columns extending longitudinally of said upper conveyor, with each column leading to a different dispenser, a lower conveyor positioned to advance trays toward a filling position just beyond and beneath said output end of said upper conveyor in a direction substantially parallel to the path of travel of said upper conveyor, means for advancing said conveyors in synchronism, said dispensers being adapted to open and close, and to permit an article held thereby to fall onto a tray in said filling position when open, and means for opening and closing said dispensers, the improvement which comprises:

means for causing relative movement between said row of dispensers and lower conveyor in a direction transverse to said lower conveyor in synchronism with the movement



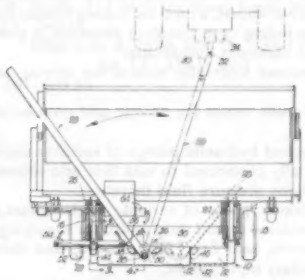
of said lower conveyor, and means in alignment with said row of dispensers for blocking only an endmost dispenser each time a selected relationship between said row of dispensers and lower conveyor resulting from said relative movement is attained while allowing other dispensers of said row to operate.

4,009,554

WINDROWER HAVING SHIFTABLE TONGUE PIVOT

Raymond A. Adee, Newton, Kans., assignor to Hesston Corporation, Hesston, Kans.

Filed Nov. 24, 1975, Ser. No. 634,829
Int. Cl.² A01D 73/00
U.S. Cl. 56—1 10 Claims



1. In a towable piece of mechanized equipment:

a mobile frame;

an elongated tongue provided with a hitch adapted to be coupled with a towing vehicle for swinging movement about a first upright axis;

connector means remote from the hitch joining the tongue with the frame for swinging movement relative to the frame about a second upright axis and for reciprocable movement relative to the frame laterally of the normal path of travel of said equipment;

power means for effecting said movements,

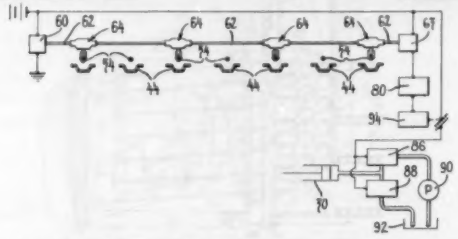
said tongue having an arch between the connector means and said hitch; and

a harvesting implement carried by the frame beneath said arch for up-and-down movement toward and away from the arch.

4,009,555
HEIGHT CONTROL FOR COMBINE HEADERS

William F. Temple, Northville, Mich., assignor to Massey-Ferguson Inc., Detroit, Mich.

Filed Feb. 26, 1976, Ser. No. 661,671
Int. Cl.² A01D 47/00
U.S. Cl. 56—10.2 11 Claims



1. A harvesting machine having a harvesting header operated by power means, control means for regulating said power means for moving said header between predetermined operating position relative to the ground and an elevated position, sensing means for sensing the elevation of said header relative to the ground, a source of light, light sensitive means responsive to the presence and absence of light from said source and being operatively connected to said control means to move said header relative to the ground between its said operating positions, and actuating means operatively connected with said sensing means to interrupt and reestablish communication of light from said source of light to said light sensitive means upon changes of elevation of said header.

4,009,556
CROP HARVESTER DRIVE AND CONTROL SYSTEM

Herbert W. Molzahn, Hamilton, Canada, assignor to International Harvester Company, Chicago, Ill.

Filed May 8, 1975, Ser. No. 575,753
Int. Cl.² B62D 11/04
U.S. Cl. 56—10.7 1 Claim

1. In a crop harvester including a self-propelled chassis, an engine, two drive wheels, a crop harvesting header coupled to the chassis including crop handling elements, a power drive system for the harvester comprising:

first and second hydraulic motors for driving said drive wheels;

a third hydraulic motor for driving said crop handling elements;

first and second hydraulic pumps of variable displacement hydraulically connected to said first and second motors for supplying pressure fluid thereto;

a third hydraulic pump of variable displacement hydraulically connected to said third motor for supplying pressure fluid thereto, said first, first, second, and third pumps having rotary input drives;

means mounting said first, second, and third pumps on said chassis with the input drives thereof successively interconnected in coaxial alignment so that the pumps may be simultaneously driven through a common input;

means drivingly connecting said engine to said common input;

and control means for varying the displacement of said first and second pumps to vary the speed of said first and second motors, whereby the speed of the crop harvester chassis may be controlled;

said control means including a control rod disposed parallel to the aligned input drives;

means pivotally interconnecting said control rod to said first and second pumps for simultaneously varying the outputs thereof in response to longitudinal shifting of said rod;

a rock-shaft journalled on said chassis and disposed transversely relative to said control rod;

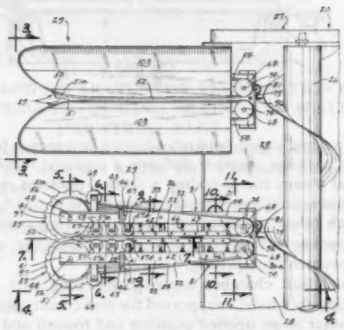
means interconnecting said rock-shaft to said control rod for shifting said control rod in response to rotation of said rock-shaft;

and a control lever secured to said rock-shaft for shifting said control rod to vary the displacements of said first and second pumps.

4,009,557
SOYBEAN HARVESTER

Allen V. Reicks, East Moline, Ill., assignor to Iowa State University Research Foundation, Inc., Ames, Iowa

Filed May 16, 1975, Ser. No. 578,274
Int. Cl.² A01D 45/02
U.S. Cl. 56—98 2 Claims



1. A soybean harvester including:

a. a portable frame movable over a field of row planted crops including a platform assembly having a rearwardly located crop inlet means and means for delivering severed crop plants to said inlet means,

b. a plurality of transversely spaced longitudinally extended row units projected forwardly from said platform assembly, each row unit having a fore-and-aft guideway over the full length thereof,

c. means movably supporting each of said row units on said platform assembly for free lateral movement of the forward end thereof,

d. a pair of endless flexible gathering means for each row unit having transversely opposite rearwardly moving runs thereof arranged at opposite sides of a guideway for engaging crop plants therebetween,

e. a pair of rotatable cutting discs corresponding to each row unit rotatably supported adjacent the forward end of a row unit at opposite sides of a guideway for rotation about upright axes,

f. each cutting disc having an upwardly and outwardly extended peripheral section and each pair of said cutting discs having the adjacent peripheral portions thereof in an overlapped relation within the transverse confines of a corresponding guideway, and

h. means on each of said discs for centering a row unit relative to each crop plant in a row,

i. with a standing crop plant in a row severed by a pair of cutting discs being engaged and carried by a pair of said gathering means to said delivery means,

j. a plurality of horizontal base members corresponding to said row units,

k. means supporting said base members on said platform assembly for projection forwardly therefrom,

l. each of said means for movably supporting a row unit including a bearing assembly,

m. means supporting each bearing assembly adjacent the front end of a base member, and

n. a shaft projected downwardly from each row unit, intermediate the ends thereof, for rotatable support within a corresponding bearing assembly to provide for a lateral

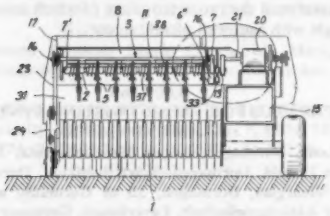
pivotal movement of a row unit about the axis of said shaft.

4,009,558

CROP-FEED ARRANGEMENT FOR HAY BALER

Rudolf Schulze, Neustadt; Horst Schumacher, Langburkersdorf, and Ferdinand Simora, Bonnewitz, all of Germany, assignors to VEB Kombinat Fortschritt, Neustadt in Sachsen, Germany

Division of Ser. No. 339,185, Aug. 3, 1973, Pat. No. 3,939,630.
This application July 17, 1974, Ser. No. 489,171
Int. Cl.² A01D *39/00*
U.S. Cl. 56—341 5 Claims



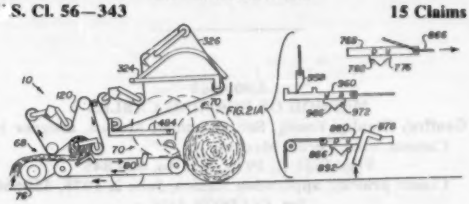
1. A baling apparatus comprising:
a housing displaceable along the ground in a travel direction;
a pickup drum at the front of said housing and rotatable about an axis transverse to said direction;
a channel member extending transverse to said direction in back of said drum;
a baling chamber on said housing at one end of said channel member;
drive means on said housing operatively connected to said drum for rotating said drum and thereby lifting crop off the ground and displacing the crop back toward said channel member;
an oscillatable member on said housing extending transversely to said direction above and between said drum and said channel member;
a plurality of pusher elements on said member displaceable from said drum to said channel member;
eccentric means operable by said drive means and coupling means connecting said eccentric means to said oscillatable member for oscillating said elements at a relatively slow rate to displace said crop from said drum into said channel member and at a relatively rapid rate away from said channel member, said coupling means including a pair of arms pivoted on said housing at one end and each connected at their other end to said oscillatable member, and a crank connected to said oscillatable member, said eccentric means including a crankshaft lying intermediate the ends of said arms and rotatable in such direction that said crank lies between said crankshaft and said oscillatable member during oscillation of said elements toward said channel member and said crankshaft lies between said crank and said oscillatable member during oscillation of said elements back from said channel member;
means on said housing in said channel member for displacing crop therealong into said chamber;
means in said chamber for forming bales of said crop; and
means including at least one spring interposed between said elements and said crankshaft whereby said elements can be restrained from motion without stopping said crankshaft, said drum being provided with a plurality of tines, said elements being engageable between said tines.

4,009,559

SYNCHRONIZING ROLL FORMING AND WRAPPING OPERATIONS IN A CROP MATERIAL ROLL FORMING MACHINE

Aquila D. Mast, Lancaster, Pa., assignor to Sperry Rand Corporation, New Holland, Pa.

Filed Feb. 9, 1976, Ser. No. 656,661
Int. Cl.² A01D *39/00*
U.S. Cl. 56—343 15 Claims



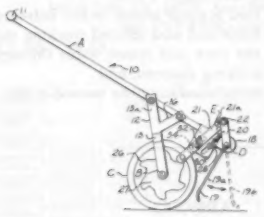
1. In a method of forming crop material rolls by a mobile machine adapted to move across a field and having front and rear roll forming chambers, the combination of steps comprising:
moving the machine across the field;
delivering crop material to said machine;
forming a roll of crop material in said rear chamber;
initiating the wrapping of said roll with twine or the like in said rear chamber in response to said roll reaching a predetermined size;
initiating the formation of another roll of crop material in said front chamber prior to termination of said wrapping of said roll in said rear chamber
completing said wrapping of said roll;
discharging said wrapped roll from said rear chamber in response to termination of said wrapping of said roll; and
transferring said another roll from said front chamber to said rear chamber after discharging said wrapped roll therefrom.

4,009,560

WHEELED RAKING DEVICE

Edward H. Wells, 111 Mooring Buoy Road, Hilton Head Island, S.C. 29928

Filed Feb. 4, 1976, Ser. No. 655,127
Int. Cl.² A01D *7/00*
U.S. Cl. 56—400.01 14 Claims



1. A wheeled raking device comprising:
a. an elongated handle member for moving and steering said device;
b. a first shaft member carried by said handle member;
c. at least one wheel member carried on said first shaft member supporting said handle member above the ground;
d. a transverse shaft rotatably carried across a lower end of said handle member;
e. a raking head having a plurality of raking tines carried by said transverse shaft;
f. connection means connected between said wheel member and said transverse shaft; and

g. said connection means imparting a rocking motion to said transverse shaft to oscillate said raking head in a raking motion as said wheel member rolls along the ground surface;

whereby said raking tines move in a raking motion to gather leaves and the like as said device is rolled along the ground.

4,009,561

METHOD OF FORMING CABLES

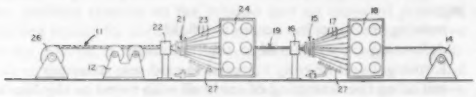
Geoffrey Stanley Young, San Jeronimo, Mexico, assignor to Camesa, S.A., Lerdo, Mexico

Filed Sept. 2, 1975, Ser. No. 609,845

Claims priority, application Mexico, June 2, 1975, 158666

Int. Cl.² D07B *3/04*

U.S. Cl. 57—6 **7 Claims**



1. A method of forming a cable including the steps of drawing a cable core through a first working station, drawing a plurality of armor wires from a rotatable bank of wires also to pass through said station, heating said armor wires prior to their arrival at said working station, winding said armor wires around said core at said working station to form a composite cable and causing the cooling wires to shrink fit on to the core.

7. Apparatus for forming a cable including

a reel for supplying a cable core,

a first working station comprising a first preforming head and a first closing die,

a first rotatable bank for supplying a plurality of first armor wires to said first working station for winding around said core,

means for heating said first armor wires between said first bank and said first working station,

a second working station comprising a second preforming head and a second closing die,

a second rotatable bank for supplying a plurality of second armor wires to said second working station for winding around the wound first armor wires,

means for heating said second armor wires between said second rotatable bank and said second working station,

means for drawing the core and armor wires through said first and second working stations, and

take up means for accommodating the wound cable.

4,009,562

METHOD AND APPARATUS FOR ELIMINATING IMPURITIES FROM AN OPEN-END SPINNING MACHINE

Herbert Stalder, Winterthur, Switzerland, assignor to Rieter Machine Works, Ltd., Winterthur, Switzerland

Filed Feb. 9, 1976, Ser. No. 656,202

Claims priority, application Switzerland, Feb. 14, 1975, 1859/75

Int. Cl.² D01H *11/00, 1/12*

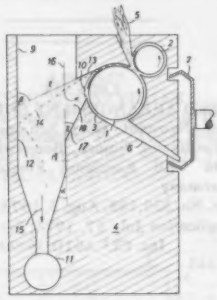
U.S. Cl. 57—56 **11 Claims**

5. In an open-end spinning machine, the combination of

a fiber opening means for opening fibers;

a duct extending in close vicinity to said opening means, said duct having a first wall opposite said opening means; and

a separating opening located between said opening means and said duct to permit passage of impurities from said opening means into said duct, said opening having a



second wall the projected plane of which forms an acute angle with said wall of said duct.

4,009,563

APPARATUS FOR FALSE-TWISTING SYNTHETIC FILAMENT YARNS

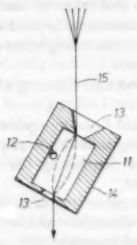
Hans Lenz, Dormagen; Edgar Muschelknautz, Leverkusen; Heiko Herold, Dormagen; Kurt Bernklau, Dormagen, and Lutz Georgias, Dormagen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Oct. 30, 1974, Ser. No. 519,302

Claims priority, application Germany, Nov. 10, 1973, 2356220

Int. Cl.² D02G *1/16*

U.S. Cl. 57—77.3 **11 Claims**



1. An apparatus for false twisting yarns moving in a take-off direction, comprising a cylindrical twisting chamber, having one or more tangential inlet bores for injection of air, and two axial bores for, respectively entry of yarn into the twisting chamber and leaving of the yarn from the twisting chamber, wherein the axis of the twisting chamber is arranged at an angle of 2° to 40° to the take-off direction of the filament.

4,009,564

ELECTRONIC WATCH CONSTRUCTION

Rudolf F. Zurcher, Newport Beach, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

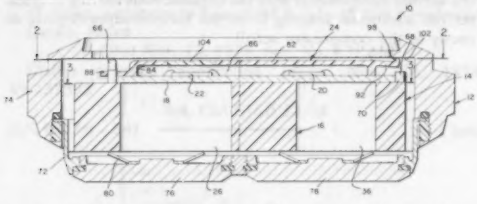
Filed Sept. 2, 1975, Ser. No. 609,258

Int. Cl.² G04B *37/04*; G04C *3/00*

U.S. Cl. 58—23 R **2 Claims**

1. A spacer block for an electronic watch module, said spacer block being formed of resilient synthetic polymer composition material and having a top surface and a bottom surface and having a battery opening extending into said block from one of said surfaces for receipt of a battery for powering the electronic watch module, said spacer block having a crystal can opening therein from one of said surfaces for positioning in said opening an electronic crystal in a crystal can, said block having resilient ears mounted on one of said surfaces said resilient ears being monolithically formed with the re-

mainder of said spacer block and permanently attached thereto and extending adjacent said crystal can opening so that said resilient ears can be resiliently bent away from said



opening for introduction of a crystal can into said crystal can opening and said resilient ears being resiliently positionable over the crystal can in said crystal can opening to retain said crystal can in said crystal can opening.

4,009,565

TIME MEASURING DEVICE HAVING A PERIODIC SIGNAL GENERATOR

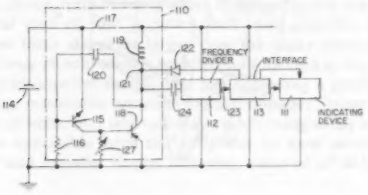
Henri Edouard Francois Marie Courier de Mere, Paris, France, assignor to BISOCA Societe de Recherches, Clichy, France

Filed Oct. 10, 1974, Ser. No. 513,927

Claims priority, application France, May 7, 1974, 74.15738; June 19, 1974, 74.21207; July 11, 1974, 74.24214

Int. Cl.² G04B *19/34*

U.S. Cl. 58—50 R **18 Claims**



1. A time measuring device comprising a continuous current source; an indicating device; oscillator means in circuit connection to be energized by said continuous current source and comprising at least one transistor, an inductance having a high overvoltage coefficient, and capacitive means including the inherent capacitance of said inductance connected in a resonant circuit to provide an oscillator assembly having a frequency several orders of magnitude greater than the control frequency of said indicating device, said frequency being determined by the values of said inductance and capacitive means, first means connected to said oscillator assembly for coupling the output to said indicating device, and second means connected directly to a terminal of said inductance and adapted to supply voltage for said indicating device.

4,009,566

DIGITAL WATCH WITH LIQUID CRYSTAL AND SEQUENTIALLY READ OUT LIGHT EMITTING DIODE DISPLAYS

Ernest C. Ho, Newport Beach, Calif. assignor to Hughes Aircraft Company, Culver City, Calif.

Filed May 27, 1975, Ser. No. 581,075

Int. Cl.² G04B *19/34*

U.S. Cl. 58—50 R **5 Claims**

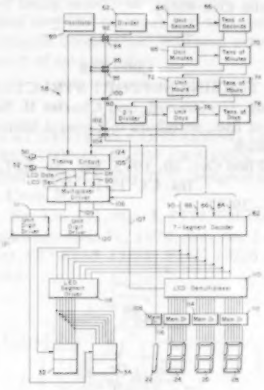
1. A digital watch for displaying selectable horological information comprising:

first display means comprising a plurality of liquid crystal display devices;

second display means comprising two light emitting diode display devices, which sequentially display a first set of horological information followed by a second set of horological information when activated;

an electronic circuit for providing information to be selectively displayed on said displays, said electronic circuit comprising an oscillator, a frequency divider coupled to the output of said oscillator for producing a timing signal, and counters for receiving said timing signal and maintaining a plurality of sets of horological information;

first and second manually operable pushbutton controls connected between said counters and said displays;



means for causing said liquid crystal display to continuously display a first set of horological information when said first and second controls are unactuated and to display a second set of horological information on said liquid crystal display when said first control is actuated; and

a timing circuit which causes said light emitting diode display to display said first set of horological information when said second control is activated.

4,009,567

DELAYED RAMPING IN THE PRIMARY CONTROL SYSTEM OR LOCAL MAINTENANCE CONTROLLER OF A GAS TURBINE IMPLEMENTED ELECTRICAL POWER PLANT

Leonard H. Burrows, Gibsonia, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 19, 1975, Ser. No. 551,201

Int. Cl.² F02C *9/08*

U.S. Cl. 60—39.03 **7 Claims**

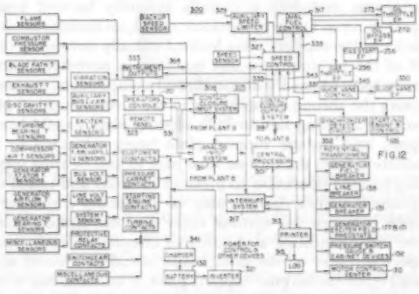


FIG. 12

7. A method of positioning fuel valve means and controlling the flow of fuel to the combustor portion of a gas turbine comprising the steps of:

a. receiving information concerning predetermined turbine operating parameters, including a signal indicative of the occurrence of a predetermined event;

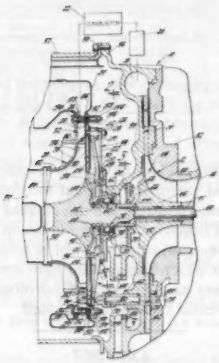
b. generating a speed setpoint signal;
c. comparing said speed setpoint signal to a signal related to actual turbine speed;
d. developing an error signal as a result of comparing said speed setpoint signal and said turbine speed signal for use in positioning the fuel valve means;
e. incrementing said speed setpoint signal at a predetermined rate after said predetermined event has occurred;
f. delaying said incrementing step by a predetermined time period after said predetermined event has occurred; and
g. holding the fuel valve means position substantially fixed during the time delay.

4,009,568

TURBINE SUPPORT STRUCTURE

Brian P. King, Greenwood, and Charles H. Smale, Indianapolis, both of Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Oct. 30, 1975, Ser. No. 627,115
Int. Cl.² F02C *7/20*
U.S. Cl. 60—39.32 **3 Claims**



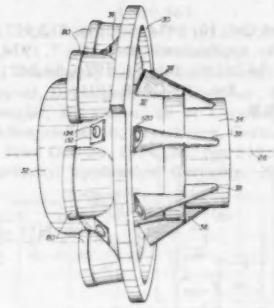
1. In a gas turbine engine of the type having a combustor and compressor with means including an inboard scroll operated at a reduced temperature and a radial turbine including a rotor having a shaft connected to the compressor and shroud components for defining a flow path across the rotor operated at a temperature in excess of the compressor temperature, the improvement comprising: means for supporting the shroud components including a radially inwardly located bearing support secured to the compressor scroll, an annular conically dished turbine support plate located radially outwardly of the shaft of the turbine rotor and including a peripheral surface thereon located axially of the shroud components, means for securing the shroud components to the turbine support plate, means for securing said turbine support plate to said bearing support, said trubine support plate being subjected to heat conduction from the turbine flow path to said bearing support during turbine operation to produce an axial and radial thermogradient thereacross capable of producing a relative deflection between the turbine rotor and the shroud components, means forming a plurality of circumferentially spaced support surfaces on the compressor scroll at a point axially spaced from the turbine support plate, a ceramic rod extending axially outwardly of each of said support surfaces having a low coefficient of thermal expansion to maintain a control length from the compressor scroll during temperature excursion of the turbine, means on each of said ceramic rods including an axial end surface located in close spaced relationship to said turbine support plate to permit a first predetermined deflection of the turbine support plate, said end surface engaging the turbine support plate upon a predetermined deflection occurring therein to limit the movement of the turbine support plate to maintain a desired clearance between the rotor and the shroud components with the ceramic rods serving to transfer the additional loading from the turbine support plate directly to the compressor scroll.

4,009,569

DIFFUSER-BURNER CASING FOR A GAS TURBINE ENGINE

Joseph R. Kozlin, West Hartford, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed July 21, 1975, Ser. No. 597,875
Int. Cl.² F02C *7/20, 3/00*
U.S. Cl. 60—39.32 **11 Claims**



1. A diffuser-burner casing for a gas turbine engine in which casing a generally axial flow of air rearwardly from the diffuser of the engine compressor is directed into combustion chamber assemblies distributed in circumaxially spaced relationship about the engine axis upstream in the flow from or forward of the turbine section of the engine comprising:
an outer structural ring portion;
an intermediate structural ring portion having an expansible connecting means and a rigid connecting means, said intermediate structural ring portion being spaced radially inward of the outer ring portion and shaped to envelop the compressor case and to expandibly engage the compressor case hot portion via said expansible connecting means, and to structurally engage the compressor case cold portion via said rigid connecting means, and to join at least part of the outer wall of the compressor diffuser;
a frustoconical wall portion interconnecting the outer and intermediate ring portions and defining a forward part of an annular plenum in which the combustion chamber assemblies are disposed;
an inner structural ring portion spaced radially inward of the intermediate ring portion and forming at least part of the inner wall of the compressor diffuser whereby the annular space between the intermediate and inner ring portions comprises at least part of the diffuser duct;
a plurality of struts distributed about the engine axis and extending between the intermediate and inner ring portions and through the diffuser duct; and
a removable plenum cover connecting with the outer structural ring portion and circumscribing the engine to define at its inner surface a radially outer wall of the annular plenum in which the combustion chamber assemblies are disposed.

4,009,570

TORQUE CONVERTER

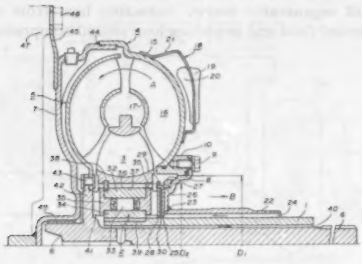
Masahiro Ohkuoo, Kadoma, and Heiji Fukutake, Osaka, both of Japan, assignors to Kabushiki Kaisha Daikin Seisakusho, Osaka, Japan

Filed Nov. 13, 1975, Ser. No. 631,663

Claims priority, application Japan, Nov. 28, 1974, 49-137392

Int. Cl.² F16D *33/00*

U.S. Cl. 60—341 **1 Claim**



1. A torque converter comprising a driving vaned impeller including a shell to which the vanes are secured, a driven vaned turbine fixed to a driven shaft, a vaned stator disposed intermediate said vaned impeller and vaned turbine, said vaned stator being fitted to a fixed stator shaft by means of a one-way clutch, a reinforcing impeller flange fixed to the inner peripheral part of said impeller shell, said impeller flange having an inner diameter larger than the outer diameter of said one-way clutch, and an impeller hub located at the inner side of said impeller flange, said hub including a guide pipe and being removably secured to said impeller flange by a plurality of bolts, and said one-way clutch being easily installable and removable from the converter by axial movement through said impeller flange following removal of only said hub.

4,009,571

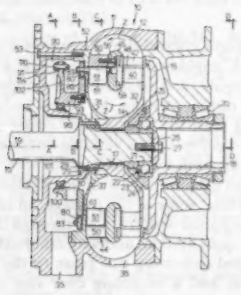
TORQUE CONVERTER HAVING ADJUSTABLY MOVABLE STATOR VANE SECTIONS AND ACTUATOR MEANS THEREFOR

James B. Black, Roscoe, Ill., and Horst G. Steinhagen, Racine, Wis., assignors to Twin Disc, Incorporated, Racine, Wis.

Filed Jan. 30, 1976, Ser. No. 654,047

Int. Cl.² F16D *33/04*

U.S. Cl. 60—354 **17 Claims**



1. In a torque converter:

a housing;

a plurality of movable stator blade sections within said housing arranged around an axis;

a ring-like member mounted on said housing concentric with said axis and connected to effect movement of said blade sections,

said ring-like member being oscillatably movable about said axis between blade open and blade closed positions; and

actuator means mounted on said housing and connected to said ring-like member to effect movement thereof,

said actuator means comprising an actuator having a first piston rod connected to said ring-like member and a power assist assembly having a second piston rod connected to said ring-like member,

said actuator being selectively actuatable to effect movement of said ring-like member and said power assist assembly acting in cooperation with said actuator to assist in movement of said member.

4,009,572

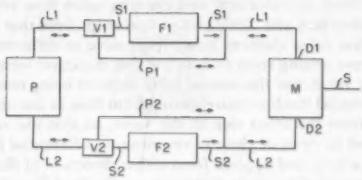
HYDROSTAT SYSTEMS CONTAINING COAXIAL MULTIDIRECTIONAL FLOW CONTROL VALVES

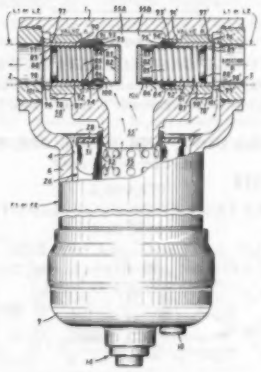
Roydon B. Cooper, Locust Valley, N.Y., assignor to Pall Corporation, Glen Cove, N.Y.

Division of Ser. No. 356,231, May 1, 1973, Pat. No. 3,908,693. This application Oct. 31, 1974, Ser. No. 519,726

Int. Cl.² F15B *15/18*; **F16K** *17/26*

U.S. Cl. 60—454 **29 Claims**





16. A hydrostat system comprising a hydraulic pump; a hydraulic motor; a fluid line operatively connecting the pump with the motor, and arranged to carry fluid flow therebetween in either direction; a unidirectional function interposed in the fluid line between the pump and the motor, for acceptance of fluid in one direction of flow between the pump and the motor; and two coaxial multidirectional flow control valves in fluid flow connection with the fluid line and with the function, and in series flow connection with the function upstream and downstream of the function, and controlling flow through the series line and connected with the function in either direction of the flow in the fluid line, the valves directing fluid flow in the same and normal direction through the function via the line in series with the function, one of the valves sensing and

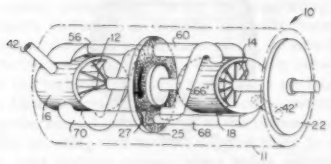
responding to a differential fluid pressure across the valve arising from one direction of the fluid flow, to direct fluid flow in the normal direction through the function, and the other valve sensing and responding to a differential fluid pressure across the valve arising from the other direction of fluid flow, to direct fluid flow in the normal direction through the function, each valve comprising, in combination, a tubular valve housing; first and second valve seats in the housing; first and second coaxial tubular valve elements nested concentrically and separately reciprocable within the valve housing towards and away from the first and second valve seats, respectively, between closed and open positions, to close and open first and second valve flow passages, respectively, of which one passage is in fluid flow connection with the series line and the other passage is in fluid flow connection with the fluid line; a fluid-pressure receiving surface operatively connected to each valve element, urging the first valve element in a first direction towards or away from its valve seat, and the second valve element in a second direction, towards or away from its valve seat; bias means urging each valve element in the opposite direction, the biasing force of the bias means being adjusted to resist movement of each valve element in said direction away from or towards its valve seat except under differential fluid pressure arising from flow and applied to the fluid-pressure receiving surface from the one or the other flow direction; and each of the valve elements moving in said direction towards or away from its valve seat and opening when flow begins from that direction and closing when flow stops from that direction, the first valve element being responsive to differential fluid-pressure arising from flow in the one direction from one side of the valve, and the second valve element being responsive to differential fluid-pressure arising from flow in the other direction from the other side of the valve, so that the valve is arranged to open or close in response to differential fluid-pressure arising and applied from either direction of flow, and to direct such flow through the passage in fluid flow connection with the function, thereby directing such flow from either direction to proceed through the function in the normal direction.

4,009,573

ROTARY HOT GAS REGENERATIVE ENGINE

Ronald W. Satz, 4518 Cedar Lake Road, St. Louis Park, Minn. 55416, assignor to Transpower Corporation, St. Louis Park, Minn.

Filed Dec. 2, 1974, Ser. No. 528,703
Int. Cl.² F02G 1/04
U.S. Cl. 60—519 **15 Claims**



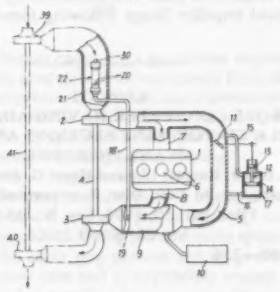
1. A hot gas engine comprising:
a. an even number of elliptical stators;
b. a plurality of cylindrical rotors equal in number to the number of said stators, one each of said rotors being disposed within and offset from the center of one each of said stators, one of said rotors and one of said stators constituting a rotor-stator pair, a longitudinal axis of said rotor of said rotor-stator pair being offset from a longitudinal axis of said stator of said rotor-stator pair;
c. a plurality of sliding vanes attached to said rotor of each said rotor-stator pair, said plurality of vanes in conjunction with the inner edge of said stator of said rotor-stator pair defining a plurality of chambers wherein compression and expansion of a fluid occur in accordance with a thermodynamic cycle, said chambers in which compression occurs define compression chambers and said chambers in which expansion occurs define expansion chambers, said compression chambers disposed at one side of said stator of each said rotor-stator pair and said expansion chambers disposed at an opposite side of said stator of each said rotor-stator pair; and
d. control means for timing said thermodynamic cycle, said control means including regenerator means operatively connected between said stators of said rotor-stator pairs, said regenerator means extracting heat from said expanded fluid and imparting heat to said compressed fluid.

4,009,574

COMPRESSION-IGNITION INTERNAL COMBUSTION ENGINES

Jean F. Melchior, Paris, France, assignor to The French State, Paris, France

Filed July 25, 1975, Ser. No. 599,140
Claims priority, application France, Aug. 1, 1974, 74.26703
Int. Cl.² F02B 33/44
U.S. Cl. 60—606 **10 Claims**

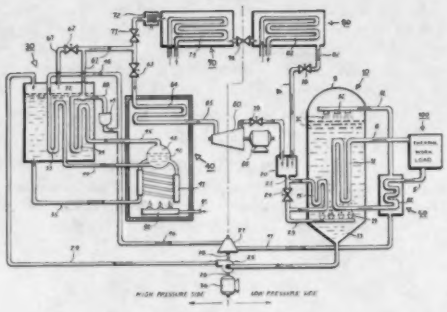


1. A power plant comprising: a compression ignition internal combustion engine; a turbo-compressor set for supercharging the engine, and comprising a compressor having an intake duct, a turbine driving the compressor and a passage communicating with the compressor outlet and the turbine inlet, the engine comprising a variable-volume working chamber so communicating via an inlet duct with the compressor outlet and via an exhaust duct with the turbine inlet as to be in parallel with at least some of the passage; an auxiliary combustion chamber supplied with fresh air through the passage, with fuel by a fuel supply system, and with combustion gases by the exhaust duct and delivering hot gases to the turbine to help drive the same; and a recycling duct one end of which is located between the downstream zone of the auxiliary combustion chamber and the turbine inlet, and the other end of which is disposed in the compressor intake duct, the recycling duct having actuating means adapted to close such duct once the compressor can, without recycling, produce upstream of the engine thermodynamic conditions for spontaneous ignition.

4,009,575
MULTI-USE ABSORPTION/REGENERATION POWER CYCLE

Thomas Hartman, Jr., 290 Lake Sue Drive, Winter Park, Fla. 32789; Ronald D. Evans, and Bruce G. Nimmo, both of Maitland, Fla., assignors to said Thomas L. Hartman, Jr., Winter Park, Fla., by said Ronald D. Evans and said Bruce G. Nimmo

Filed May 12, 1975, Ser. No. 576,449
Int. Cl.² F03G *7/00*
U.S. Cl. 60—648 **16 Claims**



1. Chemical absorption/regeneration apparatus for converting thermal energy to forms suitable for performing useful work at a high efficiency comprising:

absorber means for causing an exothermic chemical reaction;

first energy extraction means for extracting heat energy from said exothermic reaction;

first work producing means arranged to utilize such first extracted heat energy;

regeneration means for producing an endothermic chemical reaction, said reaction reversing said exothermic chemical reaction;

second energy extraction means for extracting energy introduced by said regeneration means not required for said endothermic reaction; and

second work producing means arranged to utilize such second extracted energy.

4,009,576
REGENERATOR FOR ROTARY RANKINE CYCLE ENGINES

William Allen Doerner, and Oral R. Van Buskirk, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 520,344, Nov. 4, 1974, abandoned. This application Dec. 4, 1975, Ser. No. 637,685
Int. Cl.² F01K *11/02, 11/04*
U.S. Cl. 60—669 **10 Claims**

1. A rotary Rankine cycle engine comprising:

a cylindrical housing rotatable about its axis

a coaxial annular boiler associated with said housing and rotatable therewith, said housing and boiler adapted to be rotated at a first predetermined speed to maintain in the boiler an annular body of boiler liquid having a liquid/vapor interface spaced a predetermined distance radially from said axis,

means to rotationally drive the housing and boiler at said first predetermined speed,

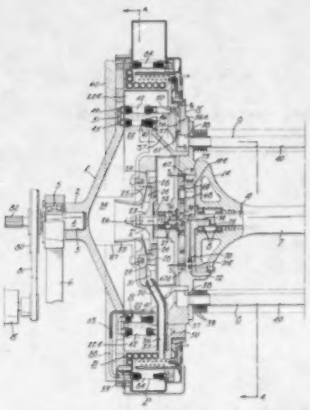
means to heat the liquid in the boiler and generate pressure vapor therein,

an expander mounted coaxially within the housing for extracting work from the pressure vapor generated in the boiler and including a coaxial driving member rotatably driven thereby at a second predetermined speed,

an annular regenerator chamber radially inward of the boiler defined by portions of the housing,

means for discharging exhaust vapor from the expander and delivering same to the regenerator chamber,

an annular regenerator in said chamber rotatable with the housing comrpising at least one annular series of a plurality of equally circumferentially spaced axially extending heat exchange tubes each having thereon an array of a plurality of axially spaced annular fins operable by rotation thereof to convey exhaust vapor discharged to said chamber outwardly between said fins,



a plurality of small elements of high thermal conductivity substantially filling each of the heat exchange tubes of said regenerator,

a condenser for the exhaust vapor mounted coaxially adjacent the housing and rotatable therewith,

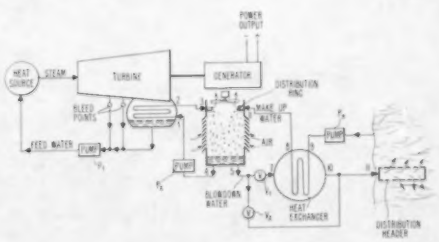
means for conducting exhaust vapor after passage through the regenerator to said condenser and for returning liquid condensate therefrom to the regenerator for passage through the tubes thereof in heat exchange relation with exhaust vapor conveyed between the fins thereon,

and means for returning the liquid condensate to the boiler after passage through the regenerator tubes.

4,009,577
COOLING TOWER BLOWDOWN HEAT EXCHANGE SYSTEM

John L. Allen, 2253 West Ave., Ocean City, N.J. 08226

Filed Jan. 21, 1976, Ser. No. 651,125
Int. Cl.² F02M *31/00*
U.S. Cl. 60—692 **10 Claims**



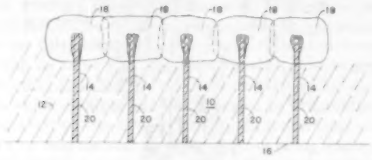
1. A method of cooling the exhaust steam from a steam turbine comprising the steps of:

a. passing the exhaust steam through a condenser;

b. passing a stream of cooling water through the condenser;

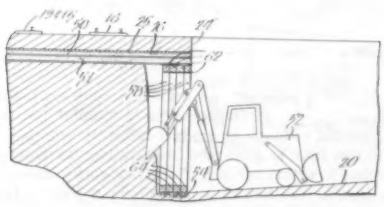
c. cooling the condenser cooling water by passing it through a cooling tower;
d. extracting blowdown water from the cooling tower to avoid a buildup of salts in the cooling water;
e. adding makeup water from an external source to the cooling tower to compensate for evaporative and drift losses in the tower and the extraction of blowdown water;
f. passing the blowdown water and the makeup water through a heat exchanger which cools the blowdown water to within a few degrees of the temperature of the makeup water;
g. discharging the blowdown water into the external source of makeup water.

4,009,578
METHOD FOR PREVENTING FLUID MIGRATION IN COAL SEAMS
Dai S. Choi, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.
Filed July 14, 1975, Ser. No. 595,938
Int. Cl.² E02D 3/14
U.S. Cl. 61—36 R **10 Claims**



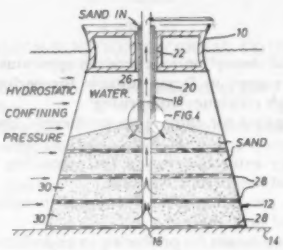
1. A method for preventing fluid migration in a coal seam, said method consisting essentially of forming a substantially fluid impermeable zone across the fluid migration path by
a. positioning at least one borehole in said coal seam in a direction generally parallel to the direction of fluid migration;
b. injecting a substantially anhydrous material selected from the group consisting of hydrogen chloride and ammonia at a pressure sufficient to force said material into the coal seam surrounding said borehole, but less than the fracturing pressure of said coal seam, in an amount equal to from about 0.01 to about 5.0 weight percent based on the weight of the coal contacted by said material; and
c. plugging said borehole to prevent retrograde flow of said materials.

4,009,579
METHOD FOR CONSTRUCTING A TUNNEL OR UNDERPASS
Delbert M. Patzner, 301 N. Main, Rochelle, Ill. 61068
Filed Dec. 8, 1975, Ser. No. 638,694
Int. Cl.² E21D 9/04
U.S. Cl. 61—42 **15 Claims**



1. A method of constructing a tunnel or underpass beneath an existing structure comprising the steps of:
inserting a plurality of longitudinal support members side by side through the ground beneath the existing structure so that the support members extend continuously beneath the structure from side to side thereof and overlie the roof of the tunnel to be formed,
after the support members are in place, excavating a longitudinal increment of the ground beneath the support members,
installing tunnel forming means beneath the support members in place of each longitudinal increment of excavated ground to support the support members, and
repeating the latter two steps until the earth has been excavated from beneath the full length of the support members and the tunnel forming means extends from one side of the structure to the other,
whereby the existing structure is continually supported by the support members during the entire period of construction of the tunnel, and the tunnel is constructed without interfering with substantially normal use of the existing structure.

4,009,580
UNDERWATER STRUCTURE
Brian Edward Wesley Dowse, Reading, England, assignor to Golder Hoek and Associates Limited, Maidenhead, England
Filed May 22, 1975, Ser. No. 579,905
Int. Cl.² E02D 27/22, 27/52
U.S. Cl. 61—88 **6 Claims**

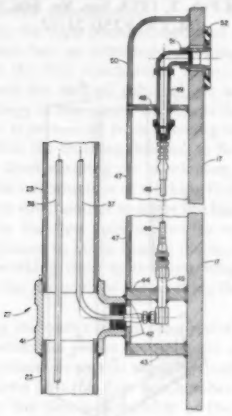


1. A method of forming an underwater structure, comprising the steps of attaching an impervious membrane to the periphery of a floatable structural unit to form an assembly defining a closed container; extending the membrane from a folded to an extended condition, when the assembly is positioned at the site where the underwater structure is to be formed to cause a base portion of the membrane to rest on the river or sea bed; filling the membrane with a body of non-settable particulate material; draining the particulate body to enable the external water pressure to exert a confining pressure on the body to render it coherent; and supporting said structural unit on the coherent particulate body.

4,009,581
GROUT LINE PROTECTED PRESSURE LINES FOR SETTING SLEEVE PACKERS
Frederick G. Britton, Bedford, and Don B. Landers, Arlington, both of Tex., assignors to Oil States Rubber Company, Arlington, Tex.
Filed May 19, 1975, Ser. No. 578,632
Int. Cl.² E02D 5/14
U.S. Cl. 61—99 **12 Claims**

1. In an offshore marine structure of the type having a platform deck supported by one or more legs extending from the platform deck to the water body bottom, said legs having piling guide sleeves mounted thereon and adapted to receive piling driven therethrough into the bottom for anchoring the structure, said sleeves having inflatable packer assemblies mounted therein and adapted to be inflated to seal the annulus formed between each sleeve and its pile prior to the annulus being filled with grouting material, said platform deck having therein grouting material supply means and packer inflation

pressure supply means, improved apparatus for connecting the grouting material supply means to a sleeve annulus and connecting the packer inflation supply means to the inflatable packer assembly associated with said sleeve including: rigid pipe means extending from the platform deck down to said sleeve; pressure conduit means inside said pipe means; first coupling means exiting said pipe means at said platform deck



for coupling one end of said conduit means to said packer inflation supply means; second coupling means exiting said pipe means for coupling the other end of said conduit means to said associated packer assembly; first grouting supply coupling means for coupling said pipe means to said grouting material supply means; and grouting feed coupling means for coupling said pipe means to said annulus.

4,009,582

METHOD FOR FORMING DEEP CAST-IN-PLACE CASELESS CONCRETE PILES

William R. LeCorgne, New Orleans, La., assignor to Interpile USA, Inc., New Orleans, La.

Filed Oct. 29, 1975, Ser. No. 627,012
Int. Cl.² E02D *5/34*
U.S. Cl. 61—53.64 **6 Claims**

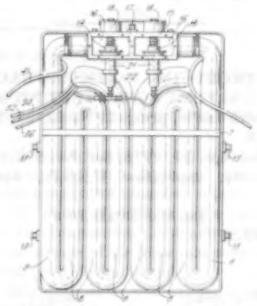
1. The method of forming a deep cast-in-place monolithic concrete pile having a predetermined diameter along its entire length, and a long design depth of earth penetration, comprising the steps of first driving a closed bottom hollow rigid cylindrical metallic pipe pile section having an axial length to span a substantial fraction of said design depth and an outer diameter substantially corresponding to said predetermined diameter into the earth at the pile site to a depth approximating the axial length of the pipe pile section and leaving a short exposed top portion of said pipe pile section at the earth surface, coupling to said exposed top portion in axially aligned relation therewith an elongated driving mandrel to dispose the mandrel in vertically aligned driving relation to the pipe pile section, driving the mandrel into the earth to drive said pipe pile section a further distance into the earth approximating the mandrel length to a depth disposing the lower end of the pipe pile section at said design depth while concurrently forming a caseless pile-molding cavity in the earth encircling and axially coextensive with the portion of the mandrel driven into the earth, the mandrel having a cross sectional configuration that affords a large void area defining uninterrupted flow channels along the mandrel portion within said cavity communicating with the hollow interior of the pipe pile section for flow of flowable concrete through said flow channels and into the pipe pile section interior, concurrently gravity feeding flowable concrete downwardly into said flow channels defined within said cavity and into the hollow interior of the pipe pile section communicating therewith during driving of the mandrel to form a column of concrete extending the full height of the pipe pile section and pile-molding cavity, and withdrawing the driving mandrel from the cavity before any concrete therein has set sufficiently such that mandrel withdrawal would damage the concrete, thereby leaving a cast-in-place monolithic concrete pile column extending throughout the cavity and the interior of the pipe member.

4,009,583

BUOYANCY CONTROL APPARATUS FOR DIVERS

Brian Leonard Buckle, 16, Sunningdale Heights, Colwyn Bay, North Wales, England

Filed Oct. 7, 1975, Ser. No. 620,275
Int. Cl.² B63C *11/02*
U.S. Cl. 61—70 **11 Claims**



1. A buoyancy control apparatus for carrying by a diver comprising:

frame means supporting coiled or looped tubular fluid-tight reservoir means;

carrying means for attachment of the frame means to a diver;

water inlet valve means for admitting water to said reservoir from externally of the apparatus to displace gas from the reservoir;

gas outlet valve means for releasing said displaced gas from the reservoir to externally of the apparatus;

gas inlet valve means for admitting compressed gas to the reservoir to displace water from the reservior; and

water outlet valve means for releasing said displaced water from the reservoir,

whereby water and gas can be selectively admitted to the reservoir to displace gas and water respectively already in the reservoir thereby to change to buoyancy of the apparatus.

4,009,584

METHOD OF AND A DEVICE FOR FORMING A FLUIDTIGHT DUCT TRANSITION THROUGH A WALL

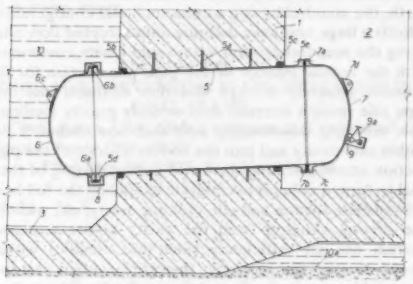
Jacques Edouard Lamy, Fontenay-aux-Roses, France, assignor to C. G. Doris, Paris, France

Filed May 1, 1975, Ser. No. 573,759

Claims priority, application France, May 17, 1974, 74.17243

Int. Cl.² F16L *1/04*; E02D *27/38*

U.S. Cl. 61—107 **18 Claims**



1. A method of executing the transition of a duct across a wall between a first space in which a first pressure prevails and a second space normally subjected to a second pressure differing from the first, comprising the steps of: forming a passage across the wall, temporarily closing the passage by a pressure-differential method which utilizes the difference between the first pressure and the second pressure, subjecting the second space to the first pressure, reopening the passage, passing the duct through the passage, temporarily sealing the passage around the duct, restoring the second pressure in the second space, and finally sealing the passage around the duct.

4,009,585

METHOD OF PRODUCING VACUUM IN RECIPIENT AND VACUUM PUMP FOR EFFECTING SAME

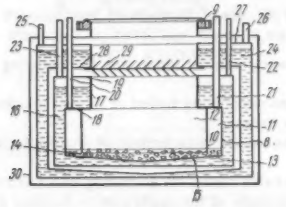
Marxen Petrovich Larin, prospekt Nauki, 29, kv. 78, Leningrad, U.S.S.R.

Filed Apr. 29, 1975, Ser. No. 572,915

Claims priority, application U.S.S.R., Apr. 30, 1974, 2019987

Int. Cl.² B01D *5/00*

U.S. Cl. 62—55.5 **9 Claims**



1. A method of producing a vacuum in a recipient comprising: filling a vessel with a condensed phase gas mass, dividing the internal vessel volume into two spaces, wherein one space is connected to the recipient and another to a preliminary evacuation system, evacuating gases from the recipient through said gas mass, solidifying said gas mass when supercooled by the removal of surface vapours coincidental with said evacuation, thereby resulting in a pressure drop in the recipient from atmospheric to an initial vacuum pressure, and further cryosorption of the recipient residual atmosphere by a solid-phase gas, resulting in a high vacuum level in the recipient.

4,009,586

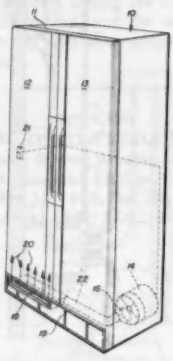
METHOD AND APPARATUS FOR PREVENTING CONDENSATION FROM FORMING ABOUT THE PERIPHERY OF A FREEZER DOOR

John A. Skvarenina, 2639 W. Augusta, Chicago, Ill. 60622

Filed Feb. 3, 1975, Ser. No. 546,768

Int. Cl.² F25D *21/12*

U.S. Cl. 62—80 **10 Claims**



10. A method of preventing condensation from forming about the outer periphery of a freezer door as set forth in claim **9** further including the step of channeling the warm air from said compressor through ducts, and discharging the warm air through outlets at the end of said ducts.

4,009,587

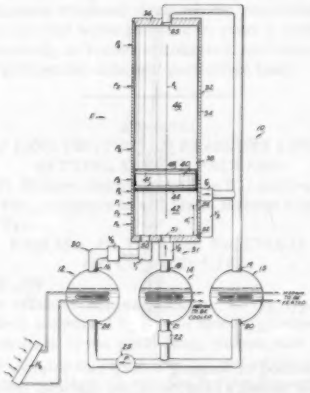
COMBINED LOOP FREE-PISTON HEAT PUMP

Glen P. Robinson, Jr., Atlanta, and Samuel V. Shelton, Stone Mountain, both of Ga., assignors to Scientific-Atlanta, Inc., Atlanta, Ga.

Continuation-in-part of Ser. No. 550,413, Feb. 18, 1975. This application Apr. 7, 1975, Ser. No. 565,629

Int. Cl.² F25B *1/00*, *27/00*

U.S. Cl. 62—116 **17 Claims**



1. A method of operating a dual loop, single working fluid, a heat pump system which has a boiler; an evaporator; a condenser; and an expansion-compression device slidably mounting a free piston in a working chamber for linear move-

ment of the free piston within the working chamber along the axis of the chamber so that the free piston divides the working chamber into a first subchamber of varying size and a second subchamber of varying size as the piston moves linearly within the chamber, where the high pressure outlet of the boiler is connected to the first subchamber, the outlet of the evaporator is connected to the first subchamber, and the inlet of the condenser is connected to the first subchamber, the method comprising the steps of:

a. pressurizing the second subchamber to urge the piston toward the first subchamber;

b. connecting the high pressure outlet of the boiler to the first subchamber to introduce working fluid from the boiler into the first subchamber to drive the piston linearly toward the second subchamber and induce linear kinetic energy in the piston while working fluid from the evaporator is prevented from entering the first subchamber and while the working fluid in the first subchamber is prevented from entering the condenser;

c. stopping the introduction of working fluid from the boiler into the first subchamber to allow the high pressure working fluid in the first subchamber to expand while the piston continues to move toward the second subchamber until the working fluid in the first subchamber has expanded to the pressure of the working fluid in the evaporator;

d. connecting the outlet of the evaporator to the first subchamber while the piston continues to move toward the second subchamber so that working fluid from the evaporator is drawn into the first subchamber to maintain the pressure in the first subchamber at the pressure of the working fluid in the evaporator as long as the piston moves toward the second subchamber with the pressure in the second subchamber being greater than the pressure of the working fluid in the first subchamber when the piston reaches its limit of movement toward the second subchamber so that the pressure of the working fluid in the second subchamber reverses the movement of the free piston and drives the free piston back toward the first subchamber while inducing linear kinetic energy in the piston;

e. preventing the flow of working fluid from the first subchamber into the evaporator, from the boiler into the first subchamber, and from the condenser into the first subchamber as the free piston moves toward the first subchamber so that the pressure of the working fluid in the first subchamber is raised as the free piston moves toward the first subchamber; and,

f. connecting the working fluid in the first subchamber to the inlet of the condenser when the working fluid in the first subchamber reaches the pressure of the condenser as the free piston moves toward the first subchamber so that the working fluid in the first subchamber is discharged into the condenser as the free piston continues to move towrd the first subchamber.

4,009,588

ELECTRICAL APPLIANCE FOR MAKING SORBET

Pierre Tanguy, Daix, and André Faivre, Dijon, both of France, assignors to Societe Anonyme Etud, Dijon, France

Filed Jan. 24, 1975, Ser. No. 543,798

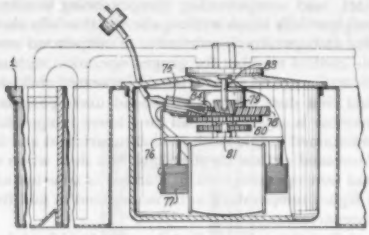
Claims priority, application France, Jan. 30, 1974, 74.03045

Int. Cl.² A23G *9/00, 9/22*

U.S. Cl. 62—126 **8 Claims**

1. In an appliance for making sorbet or ice cream and including means for preventing mixer blades from becoming locked in the ice by effecting a progressive withdrawal of the blades from a vertical orientation towards a horizontal orientation under the action of an opposing torque applied to the blades by the hardening of the ice during freezing, the improvement comprising an automatic stopping device including:

a. a stepped pinion adapted for axial displacement in dependence upon the variation of said torque applied to the blades, and



b. a switching means actuated by said stepped pinion to break a motor supply circuit when the blades reach their withdrawn position.

4,009,589

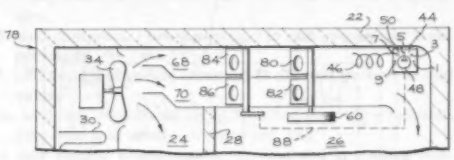
SINGLE EVAPORATOR, SINGLE FAN COMBINATION REFRIGERATOR WITH INDEPENDENT TEMPERATURE CONTROLS AND METHOD OF ADJUSTMENT

William M. Webb, Louisville, Ky., and Stephen G. Boughton, Antioch, Tenn., assignors to General Electric Company, Louisville, Ky.

Filed Jan. 2, 1976, Ser. No. 646,166

Int. Cl.² F25D *17/00*

U.S. Cl. 62—180 **3 Claims**



1. A refrigerator comprising:

a. a freezer compartment;

b. a fresh food compartment;

c. an evaporator chamber and an evaporator in said chamber;

d. an air circulation system including a fan and passageways for circulating air from both of said compartments through said evaporator chamber, a passageway for conducting a first steam of air from said evaporator chamber to said freezer compartment, and a first duct for conducting a second stream of air from said evaporator chamber to said fresh food compartment;

e. a thermostatic control for maintaining a desired temperature in said fresh food compartment by causing energization of said evaporator as required, said thermostatic control including an element for sensing temperature in said fresh food compartment;

f. a first user-operable control member for setting a desired temperature to be maintained in said freezer compartment;

g. a second user-operable control member for setting the desired temperature to be maintained in said fresh food compartment, said second user-operable control member being operatively connected to said thermostatic control;

h. a first main damper disposed within said first duct, said main damper being constructed to only partially block airflow when in the fully closed position and operatively connected to said first user-operable control member so as to permit decreased airflow through said first duct when said first user-operable control member is adjusted to call for a lower temperature to be maintained in said freezer compartment and to permit increased airflow through said first duct when said first user-operable con-

trol member is adjusted to call for a higher temperature to be maintained in said freezer compartment; and

i. a first compensating damper disposed within said first duct, said compensating damper being constructed to only partially block airflow when in the fully closed position and operatively connected to said second user-operable control member for ganged operation with said thermostatic control so as to permit increased airflow through said first duct when said second user-operable control member is adjusted to call for a lower temperature to be maintained in said fresh food compartment and to permit decreased airflow through said first duct when said second user-operable control member is adjusted to call for a higher temperature to be maintained in said fresh food compartment,

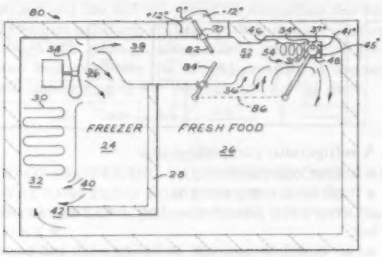
the airflow through said first duct into said fresh food compartment thereby being a function of the settings of both of said user-operable control members, said function being selected so that the desired temperature is approximately maintained in said freezer compartment even though the setting of said second user-operable control member is changed.

4,009,590

SINGLE EVAPORATOR, SINGLE FAN COMBINATION REFRIGRATOR WITH INDEPENDENT TEMPERATURE CONTROLS

William M. Webb, and William F. Hester, both of Louisville, Ky., assignors to General Electric Company, Louisville, Ky.

Filed Jan. 2, 1976, Ser. No. 646,167
Int. Cl.² F25D *17/00*
U.S. Cl. 62—180 **14 Claims**



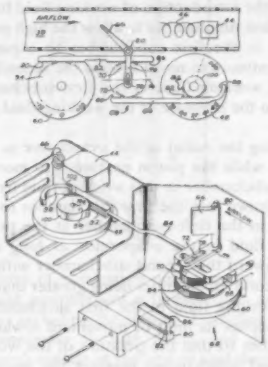
1. A refrigerator comprising:
a. a freezer compartment;
b. a fresh food compartment;
c. an evaporator chamber and an evaporator in said chamber;
d. means for conveying air from both of said compartments through said evaporator chamber;
e. means for supplying refrigerated air from said evaporator chamber to said compartments;
f. a thermostatic control for maintaining a desired temperature in one of said compartments by causing energization of said evaporator as required, said thermostatic control including an element for sensing temperature in said one of said compartments;
g. a first user-operable control member for setting a desired temperature to be maintained in the other of said compartments;
h. a second user-operable control member for setting the desired temperature to be maintained in said one of said compartments, said second user-operable control member being operatively connected to said thermostatic control; and
i. apparatus for apportioning the flow of refrigerated evaporator chamber air between said compartments as a function of the settings of both of said user-operable control members, said apparatus having a main input connected to said first user-operable control member and a compensating input connected to said second user-operable control member, and said function being selected so that the desired temperature is approximately maintained in said other of said compartments, even though the setting of said second user-operable control member is changed.

4,009,591

SINGLE EVAPORATOR, SINGLE FAN COMBINATION REFRIGERATOR WITH INDEPENDENT TEMPERATURE CONTROLS

William F. Hester, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Jan. 2, 1976, Ser. No. 646,196
Int. Cl.² F25D *17/00*
U.S. Cl. 62—180 **6 Claims**



1. A refrigerator comprising:
a. a freezer compartment;
b. a fresh food compartment;
c. an evaporator chamber and an evaporator in said chamber;
d. an air circulation system including a fan and passageways for circulating air from both of said compartments through said evaporator chamber, a passageway for conducting a first stream of air from said evaporator chamber to said freezer compartment, and a duct for conducting a second stream of air from said evaporator chamber to said fresh food compartment;
e. a thermostatic control for maintaining a desired temperature in said fresh food compartment by causing energization of said evaporator as required, said thermostatic control including an element for sensing temperature in said fresh food compartment;
f. a first user-operable control member for setting a desired temperature to be maintained in said freezer compartment;
g. a second user-operable control member for setting the desired temperature to be maintained in said fresh food compartment, said second user-operable control member being operatively connected to said thermostatic control; and
h. variable airflow control apparatus for varying airflow through said duct as a function of the settings of both of said user-operable control members, said apparatus including:
i. an adjustable air valve for controlling airflow through said duct; and
ii. a mechanical summer having a main input connected to said first user-operable control member, a compensating input connectd to said second user-operable

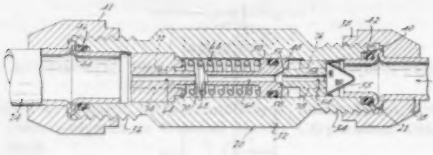
control member, and an output operatively connected to said air valve, the connection to said air valve being such that the degree of opening of said air valve is a direct function of the temperature setting of said first user-operable control member and an inverse function of the temperature setting of said second user-operable control member, said function being selected so that the desired temperature is approximately maintained in said freezer compartment even though the setting of said second user-operable control member is changed.

4,009,592

MULTIPLE STAGE EXPANSION VALVE FOR AN AUTOMOTIVE AIR CONDITIONING SYSTEM

David H. Boerger, Dearborn, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Feb. 9, 1976, Ser. No. 656,670
Int. Cl.² F25B *41/04*
U.S. Cl. 62—222 **4 Claims**



1. An air conditioning system comprising a compressor, a condenser and an evaporator arranged in a closed series circuit and a refrigerant expansion device situated between the condenser and the inlet side of the evaporator; said expansion device comprising a housing situated in a refrigerant passage between the condenser and the evaporator and adapted to pass refrigerant therethrough, a first orifice member located at the inlet side of said housing, a second orifice member located at the outlet side of said housing, a movable piston situated in said housing intermediate said first and second orifice members, each orifice member having a calibrated refrigerant flow orifice therein, said piston also having a refrigerant flow orifice therein; said piston and said first orifice member having registering portions which, when engaged, establish a continuous flow passage through said piston and said first orifice member whereby the fluid passing through said expansion device follows a flow path through the orifices in said piston and said first orifice member, said first and second orifice members having bypass passages therethrough which bypass their respective orifices, spring means for urging said piston into engagement with said first orifice member; said piston, upon a predetermined pressure drop across said expansion device, shifting against the opposing force of said spring into engagement with said second orifice member whereby the pressure drop across said expansion device is determined by the orifice characteristics of the orifices in said piston and in said second orifice member.

4,009,593

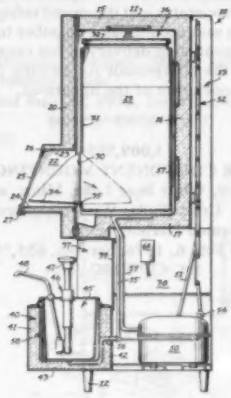
REFRIGRATED SALAD AND SALAD DRESSING DISPENSING APPARATUS

Gary A. Davis, Wichita, Kans., assignor to Stevens-Lee Company, Minneapolis, Minn.

Filed Mar. 10, 1976, Ser. No. 665,543
Int. Cl.² A47F *3/04*; B67D *5/62*
U.S. Cl. 62—250 **9 Claims**

1. A refrigerated apparatus for dispensing salad and salad dressing comprising:

a. a cabinet having front, rear, upper and lower portions,
b. an insulated salad compartment in the upper portion of said cabinet having a front opening,
c. a front door connected to said salad compartment for opening and closing said front opening,
d. a salad port in the lower portion of said front door,
e. a port door connected to said front door for opening and closing and said salad port,
f. an insulated well extending transversely in the front portion of said cabinet,
g. at least one salad dressing container in said well,
h. means for dispensing salad dressing from each of said containers,
i. a compressor compartment in the lower portion of said cabinet,



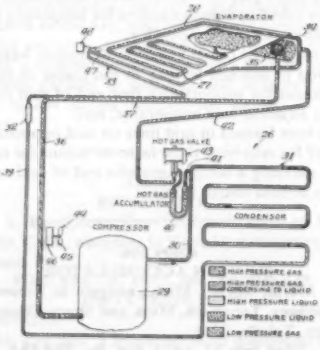
j. a refrigeration system within said cabinet including a compressor, a condenser and first and second evaporators,
k. said compressor being mounted in said compressor compartment,
l. said condenser being mounted in the rear portion of said cabinet,
m. said first evaporator being mounted in cooling relationship with said salad compartment, and
n. said second evaporator being mounted in cooling relationship with said well.

4,009,594

HOT GAS DEFROSTING APPARATUS

Donald F. Swanson, St. Paul, Minn., assignor to Whirlpool Corporation, Benton Harbor, Mich.

Filed June 2, 1975, Ser. No. 582,909
Int. Cl.² F25D *21/06*
U.S. Cl. 62—278 **13 Claims**



1. In a refrigeration apparatus having an evaporator, a compressor, means for delivering refrigerant fluid from the evaporator to the compressor, a condenser, and flow passage

means for delivering cooled liquefied refrigerant fluid from the condenser to the evaporator including a capillary tube restrictor, the improvement comprising: means defining an accumulator chamber connected in parallel with said condenser between said compressor and evaporator; delivery means for delivering hot compressed refrigerant fluid from the compressor to the condenser and said chamber during a cooling operation of the apparatus; and controlled means for causing the hot compressed refrigerant fluid delivered to said chamber to be stored therein as a liquid during refrigeration operation of said apparatus and the stored refrigerant liquid to be delivered from said accumulator chamber to said evaporator as a result of continued delivery of hot compressed refrigerant fluid from the compressor for heating the evaporator during a heating operation of the apparatus.

4,009,595

ICE MAKER COMPONENT MOUNTING MEANS

Walter C. Barnard, White Bear Lake, Minn., and Kenneth J. Dahlstrom, St. Croix Falls, Wis., assignors to Whirlpool Corporation, Benton Harbor, Mich.

Filed Feb. 6, 1976, Ser. No. 655,705
Int. Cl.² F25C *1/12*
U.S. Cl. 62—300 **28 Claims**

28. In a slab-type ice maker having a liner carried in a cabinet, an improved mounting arrangement for the evaporator means, the cutting grid means and water pan components of said ice maker comprising:

first and second bosses formed in said liner on opposite sidewalls thereof for directly supporting opposite sides of evaporator means adjacent a first end thereof;

a third boss formed in said liner on said opposite sidewalls thereof for receiving first fastener means for mounting a second opposite end of said evaporator means to said liner;

flange means supported on the rear wall of said liner for supporting a first edge of said water pan;

second fastener means for mounting a second opposite edge of said water pan to bracket means attached to said third boss by said first fastener means for supporting said water pan subjacent said evaporator;

tab means carried by said evaporator means adapted to be received in notches formed in the frame of said cutting grid means for supporting a first end of said cutting grid means adjacent said evaporator; and

a fourth boss formed in said liner on said opposite sidewalls thereof for receiving third fastener means for mounting a panel carrying a second opposite end of said cutting grid means to said fourth boss.

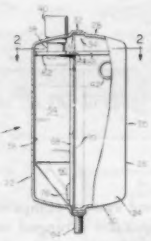
4,009,596

SUCTION ACCUMULATOR

Robert L. Morse, Adrian, Mich., assignor to Tecumseh Products Company, Tecumseh, Mich. and Sharon Manufacturing Company, Toledo, Ohio

Filed July 21, 1975, Ser. No. 597,583
Int. Cl.² F25B *43/00*
U.S. Cl. 62—503 **7 Claims**

1. In a refrigerant retention device comprising a suction accumulator or the like for a refrigerant compressing-evaporating system, said accumulator comprising a pressure vessel of the type having a liquid storage reservoir therein, a fluid inlet to said vessel communicating with said reservoir, fluid pick-up means defining a generally upright U-shaped fluid passageway disposed within said reservoir but isolated therefrom by said fluid pick-up means, a liquid metering aperture communicating the bottom bight of said fluid passageway with said reservoir, a fluid outlet from the vessel communicating with an outlet end of said fluid passageway, a baffle disposed in said pressure vessel separating said vessel fluid inlet from an inlet to said fluid passageway, said baffle having aperture means therethrough communicating the portion of said reservoir exposed to said vessel fluid inlet with the portion of said reservoir communicating with said inlet to said fluid passageway, said baffle being disposed in said vessel so as to extend generally horizontally therein and above the elevation of said vessel fluid inlet to thereby separate said reservoir into a lower, liquid-receiving chamber and an upper gas-



accumulating chamber, said upper chamber communicating with said inlet to said fluid passageway, said baffle aperture means providing communication between said chambers such that the bulk of fluid flow through said vessel occurs serially via said vessel fluid inlet, said lower chamber, said baffle aperture means, said upper chamber and thence via said fluid passageway to said vessel fluid outlet, the improvement wherein said pressure vessel is disposed with its major longitudinal axis oriented vertically and said baffle is disposed adjacent the upper end of said vessel, said vessel fluid inlet being oriented to direct a stream of fluid generally horizontally into said lower chamber and tangentially relative to a confronting interior wall of said vessel at an elevation immediately below the inlet of said fluid passageway such that the stream of fluid is caused to flow in a generally circular path in said lower chamber with a swirling action to thereby create in said lower chamber a vortex communicating with said baffle aperture means.

4,009,597

ELASTIC TAPE WITH RAVEL RESISTANT EDGE AND METHOD OF KNITTING

Cothran D. Wall, and John L. Overly, both of Browns Summit, N.C., assignors to Southern Webbing Mills, Inc., Greensboro, N.C.

Filed Dec. 24, 1975, Ser. No. 644,126
Int. Cl.² D04B *7/12, 9/12, 11/08, 23/08*
U.S. Cl. 66—193 **15 Claims**

1. A warp knit elastic fabric including at least one edge portion resistant to ravelling and including

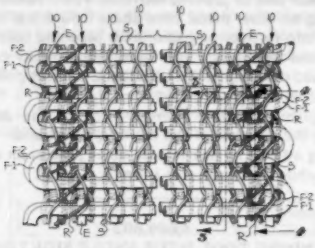
a. a plurality of walewise parallel stitch loop chains knit of stretchable yarn and forming successive courses extending from one side of said fabric to the other,

b. an elastomeric yarn inlaid in and extending along selected ones of said parallel stitch loop chains,

c. filling yarn extending back and forth across said fabric and being held in said stitch loop chains, and

d. at least one multiple wale lapping stitch loop chain knit of stretchable yarn and forming stitch loops knit in plated

relationship with the stitch loops of at least a pair of said parallel stitch loop chains extending along one selvage



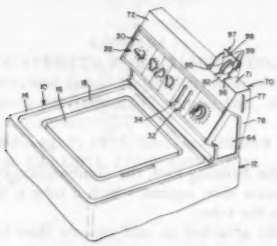
edge of said fabric for preventing ravelling of the corresponding parallel stitch loop chains.

4,009,598

AUTOMATIC TREATING AGENT DISPENSER FOR WASHING APPLIANCE

James A. Bernard, Dayton, and Roy R. Smith, Eaton, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Nov. 26, 1975, Ser. No. 635,645
Int. Cl.² D06F *39/02*
U.S. Cl. 68—12 R **4 Claims**



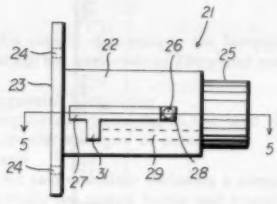
1. In a laundry machine having an outer rectangular shaped casing, said casing having an upper wall defining upper edges with said casing, a receptacle for receiving laundry and water supply means for providing water to said receptacle, a hollow control housing above said receptacle on said upper wall, including a front wall and a top wall, extending along an upper edge of said outer casing, a dispensing compartment in said control housing, a settable timer control for initiating and controlling a cycle of operations of the machine including sequential periods of wash and rinse, a liquid agent storage reservoir removably mounted on said top wall above said dispensing compartment, said reservoir providing a storage tank holding a treating agent, means for manually releasing the treating agent from said storage tank into said dispensing compartment in said control housing, means for dispensing the treating agent from said dispensing compartment into the laundry receptacle during a period of wash or rinse; liquid conduit means, including manually operable valve control means therefor, communicating between said storage tank and said dispensing compartment; said front wall having an elongated transluscent viewing window associated with said dispensing compartment providing a view of the level of liquid agent therein, said manually operable valve control means being operable for controlling the gravity flow of a liquid agent from said storage tank into said dispensing compartment, indicia means for said viewing window allowing the operator to preselect the quantity of liquid agent to be dispensed by comparing the level of said liquid agent in said viewing window with the desired indicia means while said valve control means is being manually operated and said liquid agent is flowing from said storage tank to said dispensing compartment, and liquid conduit means, including timer operable valve control means therefor, communicating between said dispensing compartment and the laundry receptacle for automatically delivering the preselected quantity of liquid agent to said receptacle.

4,009,599

PLUNGER LOCK

George P. Patriquin, Gardner, Mass., assignor to Hudson Lock, Inc., Hudson, Mass.

Filed May 29, 1973, Ser. No. 364,874
Int. Cl.² E05B *65/08*
U.S. Cl. 70—90 **14 Claims**



1. A lock comprising:

a housing;

shell means defining a keyway and longitudinally movable in said housing between a locked position and an unlocked position in response to actuation by a proper key in said keyway; and

restraining means responsive to the key for selectively preventing and allowing the removal of said shell means from said housing means, said restraining means comprising a key responsive latch means movable between a shell latched position wherein removal of said shell from said housing is prevented and a shell removal position allowing removal of said shell from said housing, said latch means being concealed by said housing when moving into said removal position so as to be operable only by the key operably positioned in said keyway, said restraining means further comprising limit means for allowing longitudinal movement of said shell beyond said unlocked position only after rotational movement of said shell within said housing, and rotational restraining means for allowing said rotational movement only after movement of said latch means to said removal position in response to actuation of the key, said limit means comprising a mating slot and stop, and rotational restraining means comprising a restraining groove in said housing that is substantially parallel to said slot and slidably retains said latch means during longitudinal motion of said shell means.

4,009,600

BIT KEY LOCK

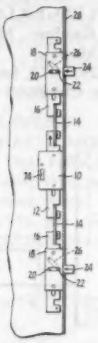
Maynard A. Boeckman, Kane, Pa., and Richard M. Singer, Lafayette, Calif., assignors to Kane Manufacturing Corporation, Kane, Pa.

Filed Aug. 29, 1975, Ser. No. 608,835
Int. Cl.² E05B *21/00*
U.S. Cl. 70—355 **4 Claims**

1. In a bit key lock, a mounting plate positioned to serve as one side of a lock housing, a cover positioned to serve as the opposite side of said lock housing, first and second keyholes formed in opposite sides of said housing, mounting posts for securing said mounting plate and cover together in laterally spaced relation, a slide lever mounted between said mounting

plate and cover on said mounting posts for reciprocal movement and having a laterally projecting arm and a key-receiving indentation in one edge portion, a plurality of lock tumblers pivotally mounted on a mounting post adjacent said slide lever and between said mounting plate and cover, said tumblers having T-shaped slots formed therein to accommodate the laterally projecting arm on the slide lever, the improvement comprising:

a. at least one deadplate positioned off-center relative to the mounting plate and cover and between two of said lock



tumblers, said deadplate having a peripheral portion extending into the lock actuating path of a key, and

b. a key that may be selectively inserted through either said first or second keyholes and having a blade portion adapted to engage said slide lever and tumblers, a notch being formed in said blade portion to accommodate said deadplate and allow at least partial rotation of said kay when inserted through said first keyhole, said blade portion being engageable with said deadplate to prevent actuation of said tumblers and slide lever if said key is inserted through said second keyhole.

4,009,601

METHOD OF AND APPARATUS FOR BENDING A DOUBLE PIPE

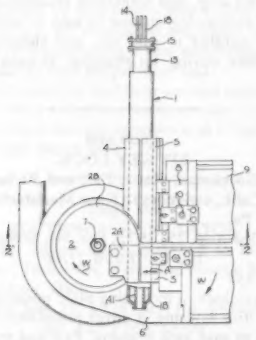
Sadaichi Shimizu, Hino, Japan, assignor to K.K. Shimizu Seisakusho, Tokyo, Japan

Filed Jan. 21, 1976, Ser. No. 650,899

Claims priority, application Japan, Jan. 24, 1975, 50-10807; Jan. 24, 1975, 50-10808; Jan. 24, 1975, 50-10809

Int. Cl.² B21D *9/04*

U.S. Cl. 72—369 **5 Claims**



4. A method for bending a double pipe comprising:

coupling the inner and outer of the double pipe together at one end;

inserting the end of the double pipe into a bending mold fixed to a turntable;

fixing the end of said double pipe opposite the coupled together end to prevent movement in a radial direction;

inserting an inner metal core and a cylindrical outer metal core into respectively said inner pipe and said outer pipe between said inner and outer pipes, said cores being inserted until the end is adjacent a contact point between said double pipe and said bending mold;

rotating the turntable thereby bending the double pipe along the contour of the bending mold; and

applying a force to rear of said inner pipe in an axial direction while said turntable is being rotated.

4,009,602

TUBE BENDING TOOL WITH ANGLE SIGHTING MEANS

Wayne A. Linquist, Rockford, Ill., assignor to Greenlee Brothers and Co., Rockford, Ill.

Filed Oct. 14, 1975, Ser. No. 622,331

Int. Cl.² B21D *7/024*; **B21C** *51/00*

U.S. Cl. 72—459 **4 Claims**

1. In a tube bending tool, the combination comprising:

a. an arcuate shoe against which a tube is bent to form a bend in the tube;

b. a handle attached to said arcuate shoe for rocking the tool on a supporting surface;

c. a tube engaging hook attached to the front end of said shoe;

d. a support structure mounted on said shoe;

e. a sighting indicator means cast with said support structure, said sighting indicator means having a non-detachable stationary projection; and,

f. a plurality of angle indicators mounted on the front end of said shoe for selective alignment by operator sight with said sighting indicator during a tube bending operation for making accurate bends in a tube.

4,009,603

ZERO SPEED CALIBRATION METHOD AND APPARATUS FOR USE WITH AN ELECTRO-MAGNETIC UNDERWATER LOG FOR MARINE VESSELS

Marvin J. Molny, Huntington, N.Y., assignor to Sperry Rand Corporation, New York, N.Y.

Filed Feb. 13, 1976, Ser. No. 657,900

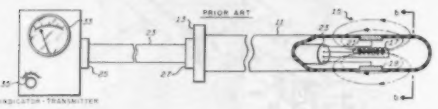
Int. Cl.² G01F *1/64*, *25/00*

U.S. Cl. 73—3 **6 Claims**

1. An improved electro-magnetic underwater log for measuring the speed of a marine vessel, said log being of the type that includes a submersible sensor unit having an electrical coil for establishing a magnetic field with a component essentially perpendicular to the direction of the vessel's forward motion and voltage sensing means for detecting the voltage gradients induced in water flowing through said magnetic field by virtue of the fore-aft motion of the vessel, said log further

including means to energize said coil, and adjustable indicating means responsive to said detecting means for displaying the speed of the vessel, said improvement consisting of zero speed calibration apparatus comprising means to disconnect the energizing means from the coil and to substitute a dummy load across the coil, and means to set said indicator means to zero value when said coil is terminated by the dummy load.

6. A method for calibrating an electro-magnetic underwater log used for indicating the speed of a marine vessel, said log being of the type having submersible sensing means and onboard indicator/transmitter means, said submersible sensing



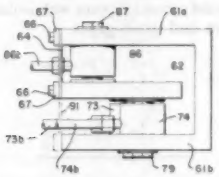
means including coil means for establishing a magnetic field and detecting means for detecting voltage gradients induced in the water flowing through said magnetic field, said indicator/transmitter means including means for energizing said coil and adjustable indicating means responsive to the magnitude of the detected voltage gradients for indicating the speed of the vessel, said method comprising the steps of disconnecting said energizing means from said coil means, terminating said coil means and said energizing means with individual loads, energizing said log and adjusting said indicating means to a zero speed reading.

4,009,604

PRESSURE CONVERTER FOR CALIBRATING GAUGES

Samuel D. Taber, and James H. Coulter, both of Santa Rosa, Calif., assignors to National Controls, Inc., Santa Rosa, Calif.

Filed Aug. 7, 1975, Ser. No. 602,569
Int. Cl.² G01L *27/00*; G01G *5/04*
U.S. Cl. 73—4 R **3 Claims**



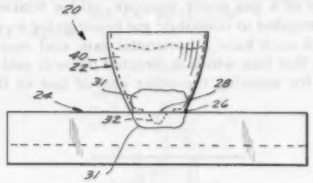
1. In a pressure converter for connection between a pressure source and a pressure operated indicator: a base having first and second spaced apart, generally parallel legs, a beam member disposed between the legs of the base and extending in a direction generally parallel thereto, a flexure connected between the beam member and one of the legs of the base, first and second force-pressure transducers mounted respectively on the first and second legs of the base, each of the transducers comprising a chamber for receiving fluid and movable means for varying the volume of the chamber, means for connecting the chamber of the first transducer to the pressure source, and means for connecting the chamber of the second transducer to the indicator, the movable means of the first and second transducers being connected to the beam member at predetermined distances from the flexure, whereby the pressure applied to the indicator is determined by the source pressure and the ratio of the predetermined distances, the transducers being mounted on the legs of the base in a manner permitting adjustment of the predetermined distances.

4,009,605

METHOD FOR DETERMINING T_{250} TEMPERATURE

Alfred E. Kober, Hopatcong, N.J., assignor to Apollo Chemical Corporation, Whippany, N.J.

Filed Feb. 24, 1976, Ser. No. 660,828
Int. Cl.² G01N *11/04*
U.S. Cl. 73—56 **11 Claims**



1. A method for rapidly determining the temperature at which a given coal ash has a viscosity of 250 poises comprising the steps of

A. providing apparatus comprising

i. an open top container having at the base thereof a generally circular aperture of substantially 0.25 inch diameter, and

ii. a support for said container including a compartment at least partially positioned below said container and communicating with the interior of said container through said aperture, at least a vertical section of said compartment directly beneath said aperture being subject to visual inspection;

B. packing into said container a thick paste sample formed by mixing a thickener solution with a predetermined quantity of coal ash sufficient to fill said vertical section of said compartment; and

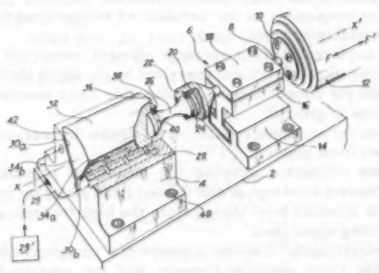
C. heating said sample at a predetermined slow rate at least until said coal ash therein becomes molten and fills at least said vertical section of said compartment, the temperature of said sample at that point being approximately the temperature at which said coal ash has a viscosity of 250 poises.

4,009,606

DEVICE FOR THE STUDY OF MATERIALS SUBJECTED TO ALTERNATE TENSILE AND COMPRESSIVE TESTS

Jean-Claude Clebant, Carbon Blanc, and Jean-Claude Fecan, Merignac, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Jan. 21, 1976, Ser. No. 650,918
Claims priority, application France, Jan. 27, 1975, 75.02444
Int. Cl.² G01N *3/32*
U.S. Cl. 73—91 **7 Claims**



1. A device for subjecting *n* (*n* 1) test specimens of a material to alternate tensile and compressive stresses, wherein

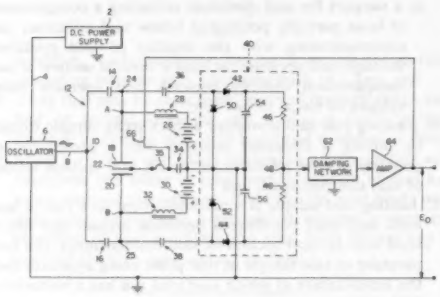
said device comprises an excitation source having a horizontal axis of displacement, a guide rod in which one end of said rod is rigidly fixed to said exciter and the other end is fitted with *n* elements for securing one of the ends of the *n* test specimens, said rod being guided so as to be capable of free translational displacement along a horizontal axis and a massive part provided with *n* horizontal bearing blocks and with nozzles for the injection of a gas under pressure, said *n* bearing blocks being thus intended to constitute gas bearings for *n* cylindrical masses which each have a horizontal axis, said masses being provided on that face which is directed towards said rod with an element for securing the other end of one of the *n* test specimens.

4,009,607

FORCE MEASURING SYSTEM INCLUDING COMBINED ELECTROSTATIC SENSING AND TORQUING MEANS

William H. Ficken, Berkeley Heights, N.J., assignor to The Bendix Corporation, Teterboro, N.J.

Filed Dec. 24, 1975, Ser. No. 644,218
Int. Cl.² G01L *1/08, 1/14;* **G01P** *15/08*
U.S. Cl. 73—141 R **4 Claims**



1. A force measuring system, comprising: a signal source for providing a relatively high frequency alternating signal;

a capacitance bridge arrangement connected to the signal source and energized by the high frequency alternating signal therefrom, and including a pair of fixed capacitors and a pair of variable capacitors formed by a displaceable force sensitive element displaceably mounted to a case and disposed between two plates fixed to the case, the force sensitive element normally in a null position relative to the fixed plates for providing a balanced bridge condition;

the displaceable force sensitive element being displaced by an applied force toward one of the fixed plates for providing an unbalanced bridge condition;

means responsive to the unbalanced bridge condition for providing an error signal;

the displaceable force sensitive element connected to the error signal means and energized by the signal therefrom;

means for connecting the displaceable force sensitive element to ground;

means for providing constant level signals for energizing the two fixed plates;

means connected between the means for providing the constant level signals and the two fixed plates for isolating the constant level signals from the high frequency alternating signal; and

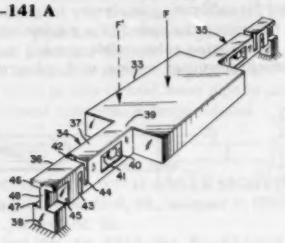
an electrostatic reaction between the energized displaceable force sensitive element and the energized fixed plates providing a restoring force for restoring the force sensitive element to the null position, the restoring force being a measure of the applied force.

4,009,608

SHEAR MEASURING FLEXURE ISOLATED LOAD CELLS

Alfred Newman Ormond, 11969 E. Rivera Road, Santa Fe Springs, Calif. 90670

Division of Ser. No. 542,369, Jan. 20, 1975, Pat. No. 3,985,025. This application Jan. 12, 1976, Ser. No. 648,454
Int. Cl.² G01L *1/26*
U.S. Cl. 73—141 A **2 Claims**



1. In combination, at least two shear measuring load cell bodies, each having first and second end portions, one of said end portions including load responsive strain gage means and the other including integrally formed flexure means, and a platform for carrying a load generally normal to the plane of the platform, said load cell bodies being secured between peripheral points of said platform and a stationary structure such that a straight line passing through said first and second end portions is parallel to the plane of said platform, said flexure means substantially isolating extraneous moments from said load responsive strain gage means so that only a force component normal to the plane of said platform is measured, said one end portion including a cut-out window having an integrally formed diagonal bar lying in a plane normal to the plane of the platform and parallel to said straight line, said strain gage means comprising strain gages fixed to opposite sides of said bar, said flexure means comprising oppositely directed slots in said other end portion of said body defining therebetween a first flexure web lying in a plane perpendicular to said straight line and to the plane of said platform, and a cut-out portion defining opposed flanges having a second flexure web therebetween lying in a plane including said straight line and normal to said first flexure web and the plane of said platform, said second flexure web isolating extraneous torsion forces from said strain gages.

4,009,609

METHOD AND APPARATUS FOR TESTING A SUBSURFACE FORMATION FOR FLUID RETENTION POTENTIAL

Wayne L. Sayer, 1755 Trinity, No. 12, Walnut Creek, Calif. 94596, and Pat Wright, 1967 Desert Circle, Apt. No. 8, Walnut Creek, Calif. 94598

Filed Aug. 15, 1975, Ser. No. 605,213
Int. Cl.² G01V *9/00*
U.S. Cl. 73—155 **12 Claims**

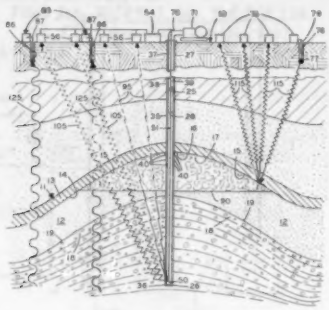
1. A method for testing a subsurface formation for fluid retention potential, comprising the steps of:

forming a borehole leading into communication with the formation;

inserting a buoyant fluid into the formation through the borehole laterally thereof; and

conducting test energy, affected by contact with said fluid,

through the formation laterally of the borehole to determine the location and concentration of the fluid within



the formation by determination of the test energy affected by contact with said fluid

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4,009,610

ROLL MOUNT FOR PLUG ROLLING MILL

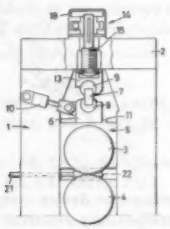
Manfred Hien, and Paul Schmitt, both of Saarbrucken, Germany, assignors to Mannesmann Aktiengesellschaft, Dusseldorf, Germany

Filed Apr. 30, 1976, Ser. No. 681,825

Claims priority, application Germany, May 22, 1975, 2523023

Int. Cl.² B21B *31/32, 17/10, 25/02*

U.S. Cl. 72—209 **5 Claims**



1. In a plug rolling mill having a stand and a pair of grooved rolls the improvement comprising in combination:

a carrier for one of the rolls of the pair disposed for up and down movement in the stand;

first hydraulic means coupled to the carrier and to the stand for holding said carrier in vertically variable positions in relation to the other one of the rolls of the pair;

a carriage laterally movably disposed on the carrier;

second hydraulic means coupled to the stand and to the carriage for reciprocating the carriage on the carrier;

a pivotal mount for said carriage holding the carriage against the carrier in a first, protracted position of the second drive thereby urging the carrier and the one roll into a particular operating positon, the mount permitting said carrier to yield in a direction away from said other roll upon retraction of the carriage by the second drive from the first position; and

means for mounting said mount to said stand so that forces acting on the carrier during rolling are being reacted through the carriage and the mount into the stand.

4,009,611

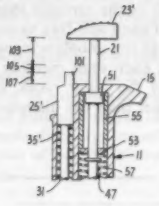
HAND-HELD MICROPIPETTOR WITH IMPROVED PIPETTE TIP EJECTOR

George Warren Koffer, Los Altos, and Doud Roger Branham, Redwood City, both of Calif., assignors to Oxford Laboratories Inc., Foster City, Calif.

Filed May 13, 1976, Ser. No. 686,240

Int. Cl.² B01L *3/02*

U.S. Cl. 73—425.6 **5 Claims**



1. In a hand-held micropipettor, comprising:

an elongated body having one defined end,

a piston chamber within said body oriented along the length of said body,

a piston within said piston chamber and adapted to move back and forth in an axial direction of said elongated body,

means extending from said piston out of said one defined end of said body to a first knob for providing such reciprocal motion to said piston by depression of said first knob,

a resilient element normally urging said first knob outward away from said one defined end of the body, another end of said body being adapted to frictionally engage the interior of a detachable plastic tip,

a tip ejecting sleeve surrounding at least a portion of said body adjacent its said tip holding end and operable in an axial direction along the body between a normal position that does not interfere with the attachment of a tip to said another end and a tip ejecting position which forces a tip from said another end of the body, and

a resilient means operably connected between said ejecting sleeve and said body for urging said sleeve toward its said first position absent manual operation thereof, the improvement comprising:

a second knob body positioned at said one defined body end and adjacent said first knob, and

means connecting said second knob and said tip ejecting sleeve for operating said sleeve to its said second position upon an axial movement of said second knob in a direction toward said tip engaging end of the body.

4,009,612

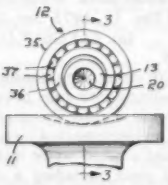
WHEEL BALANCER

James A. Johnson, 59 Ocean House Road, Cape Elizabeth, Maine 04107

Filed Nov. 24, 1975, Ser. No. 634,931

Int. Cl.² G01M *1/12*

U.S. Cl. 73—480 **5 Claims**



1. A device for use in supporting a circular member to

determine whether it is balanced relative to its axis of rotation as defined by an axial shaft member extending from both sides of the circular member, spaced support members, each having an upwardly opening arcuate seat, and bearing units for each end of the axial member and of the type including inner and outer races and a series of rotatable members rotatably confined therebetween, the radius of each seat greater than that of each outer race, the outer race of each unit resting on and centered by the appropriate one of said seats and held against turning by the weight of the circular shaft members and the other race member of each unit free to turn as the axial member turns in response to any unbalancing weight distribution of the circular member, each shaft member end supported by a corresponding one of the inner races, and the diameter of each inner race greater than the diameter of the ends of the member it supports.

4,009,613

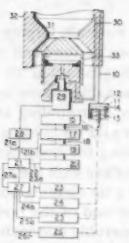
APPARATUS AND METHOD FOR INDICATING AT THE SURFACE THE MEASUREMENT OF A DOWNHOLE CONDITION

John D. Jeter, 201 W. Clara, Iowa Park, Tex. 76367

Division of Ser. No. 409,176, Oct. 24, 1973, Pat. No. 3,908,453. This application July 24, 1975, Ser. No. 598,708

Int. Cl.² F21B *47/06*

U.S. Cl. 73—155 **21 Claims**



1. A method of indicating at the earth surface the measurement of a condition in an earth borehole in which a pipe string is situated comprising the steps of; measuring the condition, sending a signal to the surface after a delay that is proportional to the measurement and measuring the delay in terms of the amount of movement of at least one material moving within the pipe string outer surface envelope.

4,009,614

APPARATUS FOR MONITORING TWO-PHASE FLOW

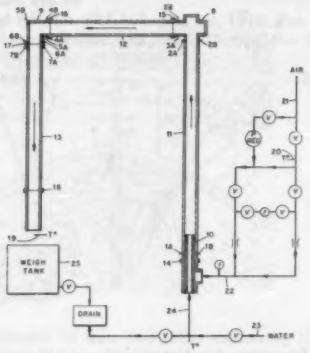
John D. Sheppard, Oak Ridge, Tenn., and Long S. Tong, Gaithersburg, Md., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Dec. 19, 1975, Ser. No. 642,439

Int. Cl.² G01F *1/86*

U.S. Cl. 73—195 **3 Claims**

1. In a system for monitoring transient two-phase flow rates, said system including a flow tube provided with a vertical leg having a vapor-liquid mixture flowing therethrough, said vertical leg including an instrumented piping spool piece for monitoring flow of said air and water mixture through said flow tube, said spool piece including a drag disk flowmeter, a gamma densitometer, and a turbine flowmeter, the improvement comprising a flow disperser mounted in said vertical leg of said flow tube upstream from said spool piece, and said drag disk flowmeter being positioned upstream from said turbine flowmeter, whereby the mass two-phase flow rate through said



flow tube can be accurately determined from the outputs of the flow meters and the densitometer of said spool piece.

4,009,615

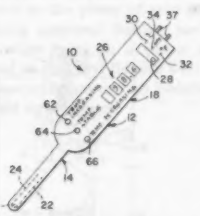
SELF CONTAINED ELECTRONIC DIGITAL THERMOMETER

George A. Ruhl, 95 Hartley Ave., Mt. Vernon, N.Y. 10550

Filed Dec. 23, 1975, Ser. No. 643,677

Int. Cl.² G01K *3/00*

U.S. Cl. 73—362 AR **1 Claim**



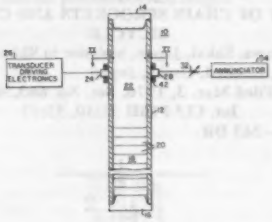
1. A digital thermometer device comprising: an elongated probe carrying a temperature electrical transducer means at its front end and a first electrical digital display means at its rear end; said transducer means having an analog output; switch means mounted on the rear end of said probe for selecting readout of said first display means in either degrees Fahrenheit or degrees Centigrade; and circuit means housed within said probe for converting the analog output of said transducer means to a digital signal for driving said first display means; said circuit means including amplifier means fed by said analog output; said amplifier means having first and second sets of gain and bias parameters selectable by said switch means; second electrical display means on the rear end of said probe for indicating whether the analog output of said transducer is increasing, decreasing or is substantially stable; a differentiator means fed by said amplifier means and feeding said display means; said comparator means having three output signals for feeding said second display means, a first output indicative of whether the output of said differentiator means is greater than a predetermined positive constant; a second output indicative of whether said differentiator output is less than the negative of said constant; and a third output indicative of whether said differentiator output is between said positive constant and the negative of said constant.

4,009,616

ACOUSTIC METHOD FOR MEASURING GAS PRESSURE

James W. Wonn, Irwin, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Jan. 29, 1975, Ser. No. 545,238
Int. Cl.² G01L 9/00; G01N 29/02
U.S. Cl. 73—398 R **8 Claims**



1. A method of nondestructively measuring over a wide continuous range of pressures the gas pressure within a pressurized nuclear fuel element having a nuclear fuel region and a gas plenum hermetically sealed within an elongated tubular cladding having portions of the cladding walls constructed of an acoustically conductive medium, without violating the integrity of the cladding comprising the steps of:

generating an acoustic signal exterior of the cladding;

transmitting the acoustic signal through an acoustically conductive portion of the cladding wall in the plenum region along a selected path within the gas medium sealed within the plenum in a direction across the longitudinal axis of the fuel element that continues through a second acoustically conductive portion of the cladding wall;

receiving the acoustic signal after it has traversed the selected path through the gas, exterior of the second portion of the cladding wall;

converting the received acoustic signal into a corresponding electrical output; and

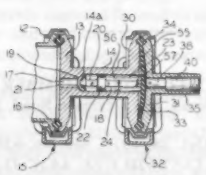
calibrating the electrical output against a standard to provide a direct measure of the pressure of the gas within the enclosure over a wide range of pressures.

4,009,617

ON-LINE LIQUID SAMPLERS

Julius Theodore Johnson, 348 - 20th St. SE., Cedar Rapids, Iowa 52403

Filed Mar. 18, 1976, Ser. No. 667,971
Int. Cl.² G01N 1/14
U.S. Cl. 73—422 TC **8 Claims**



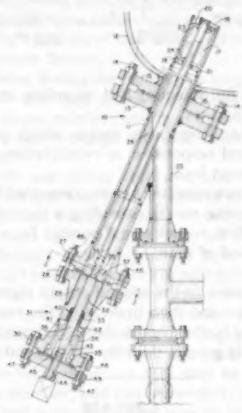
1. A sampling device for periodically withdrawing small samples of a liquid flowing through a pipe, which device comprises a sample intake member having a sample intake passage, an entrant port at one end of said intake passage, and a diaphragm pumping chamber at the opposite end of said intake passage; said diaphragm pumping chamber having a flexible diaphragm extending thereacross and subdividing said chamber into a pneumatic side and liquid pumping side, the latter being in communication with said intake passage; means for periodically applying pneumatic pressure to the pneumatic side of said chamber; a check valve axially slidable in said intake passage; a valve seat in said intake passage adjacent said port; a valve head on one end of said check valve seatable in said valve seat upon axial movement of said check valve toward said port; said check valve having its opposite end projecting into said chamber and in contact with said diaphragm whereby said check valve is moved positively by said diaphragm during its pumping stroke to port-closing position when pneumatic pressure is applied to said diaphragm, said valve and said intake passage having spaced portions therebetween for flow of liquid into and through said passage into said chamber; a sample discharge member having a sample discharge passage communicating with said intake passage; valve means in said discharge passage adapted to open upon build-up of liquid pressure in said intake passage and diaphragm chamber during said pumping stroke of said diaphragm; and means on said sample discharge member for collecting the increments of samples of liquid withdrawn from said pipe by said sampling device.

4,009,618

REACTOR SAMPLER

Robert Michael Chatham, Cleethorpes, England, assignor to Continental Oil Company, Ponca City, Okla.

Filed Feb. 12, 1976, Ser. No. 657,671
Claims priority, application United Kingdom, Feb. 17, 1975, 6592/75
Int. Cl.² G01N 1/10
U.S. Cl. 73—424 **10 Claims**



1. A sampling apparatus for removing a sample of particulate solid catalyst from the interior of a reactor comprising:

a. an elongated tube member having an end cap with an opening therein;

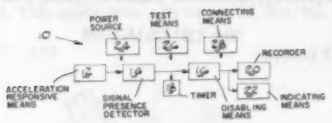
b. an actuating rod extending through said tube member and having a pair of discs attached thereto, each of said pair of discs having a notched opening therethrough, and said pair of discs being spaced longitudinally one from the other;

c. a plate member in said elongated tube member longitudinally spaced from said end cap, said plate member being affixed to the interior of said tube member and having a first opening therethrough through which said actuating rod extends, said plate member having a second opening therethrough for delivery of catalyst particles;

d. a sample chamber defined by the portion of said elongated tube member between said end cap and said plate member, said sample chamber being selectively open to or isolated from the interior of a reactor in which it is located, and said sample chamber being selectively open to or isolated from a sample delivery means attached to said sampler;

e. a turning member engageable with said actuating rod for rotation of said actuating rod, said turning member extending through a stuffing box detachably affixed to said elongated tube member, said stuffing box comprising a sleeve having a bore therethrough, said bore including a counterbored section and an expanded bore section terminating in a threaded section;
f. packing ring means in the counterbored section of said bore and about the turning member extending therethrough;
g. a packing nut in the expanded bore portion of the stuffing box threadedly engaged with the expanded bore section of said stuffing box; and
h. a packing gland between said packing nut and said packing ring means.

4,009,619
ACCELEROMETERS
Mattheus Johannes Snyman, 805 Lukas Meyer St., Tileba, Pretoria, Transvaal, South Africa
Filed Apr. 18, 1975, Ser. No. 569,406
Claims priority, application South Africa, Apr. 19, 1974, 74/2501
Int. Cl.² G01P *15/08*
U.S. Cl. 73—517 R **7 Claims**

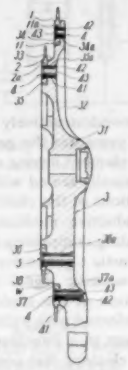


1. Apparatus for detecting and recording abuse of a motor vehicle, including:
an acceleration responsive means which provides a first output signal responsive to acceleration of the vehicle above a preset level;
a signal presence detector means connected to the acceleration responsive means providing a second output signal when the first output signal persists for a first predetermined period of time;
a recorder;
means responsive to the second output signal for actuating the recorder and then preventing the recorder from recording any further signals during a second period of time substantially greater than the first period of time.

4,009,620
DRIVE BELT
Lawrence M. Thompson, Lancaster, Pa., assignor to The Arbee Corporation, Manheim, Pa.
Filed Sept. 25, 1975, Ser. No. 616,768
Int. Cl.² F16G *51/80*; B29H *7/22*
U.S. Cl. 74—236 **5 Claims**

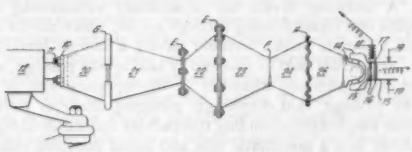
1. A drive belt comprising a series of links arranged in superimposed successive overlapping relation, each of said links having apertures at the forward, intermediate and trailing portions of the link, fastening means extending through the apertures in the overlapping portions of the link and having means at the opposite end thereof engaging the innermost and outermost links to secure said plurality of links together, said links comprising a homogeneous material devoid of fibrous reinforcement and consisting of a segmented thermoplastic copolyester containing long chain ester units derived from dicarboxylic acids and long chain glycols and short chain ester units derived from dicarboxylic acid and low molecular weight diols, and having a durometer higher than 40D(92A) and lower than 72D.

4,009,621
ASSEMBLY OF CHAIN SPROCKETS AND CRANKS FOR BICYCLE
Takashi Segawa, Sakai, Japan, assignor to Shimano Industrial Company, Limited, Osaka, Japan
Filed Mar. 3, 1976, Ser. No. 663,364
Int. Cl.² F16H *55/30, 55/12*
U.S. Cl. 74—243 DR **7 Claims**



1. An assembly of chain sprockets and cranks for a bicycle, comprising:
a plurality of chain sprockets of different diameters, said chain sprockets being annular ring-like plate members with teeth on the outer periphery thereof and having mounting bores spaced circumferentially about said ring-like plate members;
a plurality of mounting arms for fixing said chain sprockets thereto; and fixing means for fixing said chain sprockets to said mounting arms respectively, said mounting arms having bases connected together, each of said mounting arms extending radially outwardly from its base and terminating in a tip, each of said mounting arms having a plurality of seats formed therein at different radii from its base to its tip, each of said seats having a mounting bore aligned with one of the mounting bores on the appropriate diameter sprocket, whereby said chain sprockets are supported by each of said seats and fixed thereto by said fixing means.

4,009,622
COLLAPSIBLE MEMBER
Mitja Victor Hinderks, 15a Adamson Road, London, England (NW3)
Filed Oct. 28, 1975, Ser. No. 626,535
Int. Cl.² B62D *1/18*; A62C *35/12*
U.S. Cl. 74—492 **9 Claims**



1. A collapsible structural member for absorbing loads,

comprising a plurality of generally truncated conical members substantially coaxially arranged in end-to-end relation, said structural member having a first predetermined length, at least one of said conical members including means facilitating the splitting of a portion of the conical surface of said at least one conical member upon application thereto of a predetermined, substantially axial load to thereby collapse said structural member to a second predetermined length.

4,009,623

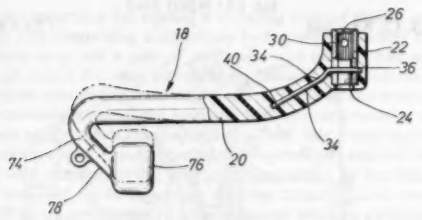
FOOT LEVER CONSTRUCTION HAVING CONTROLLED FLEXIBILITY

Grover C. Smith, and Thomas M. Smith, both of Houston, Tex., assignors to Interstate Sports, Inc., Houston, Tex.

Filed Dec. 17, 1974, Ser. No. 533,700

Int. Cl.² G05G 1/14

U.S. Cl. 74—512 **14 Claims**



1. A controllably yieldable foot lever for motorcycles and other mechanical devices which will yield in controllable manner in the event of impact with an object to prevent excessive forces from being transmitted to a lever shaft to which the lever may be connected and which is controllably yieldable to prevent the transmission of excessive torque forces to said lever shaft, said foot lever comprising:

a body of yieldable material formed in the configuration of a foot lever and defining a free extremity and a shaft connection extremity of said lever extending in transverse relation to said shaft connection extremity;

an insert of substantially rigid material and of non-cylindrical external configuration being intimately retained within said body of yieldable material at said shaft connection extremity, said insert being formed to be received in substantially immovable assembly with said lever shaft;

shaft receiving means being formed within said insert;

locking means being received by said insert and being adapted to establish locking engagement between said insert and said shaft; and

an elongated structural element extending from said insert and being molded within said body of yieldable material, said elongated structural element extending within said body at least partially along the length of said body and terminating short of the free extremity of said lever and causing said lever to be more rigid in the vicinity of said shaft connection extremity than at said free extremity thereof.

4,009,624

APPARATUS FOR MENDING A PUNCTURE IN A TUBELESS TIRE

Tatuji Nishino, No. 456-4, Oaza-Yakatabara, Fukuoka, Fukuoka, Japan

Continuation-in-part of Ser. No. 428,742, Dec. 27, 1973, abandoned, which is a division of Ser. No. 220,301, Jan. 24, 1972, abandoned. This application Aug. 6, 1975, Ser. No. 602,311

Claims priority, application Japan, Jan. 28, 1971, 46-3354[U]; Feb. 10, 1971, 46-5728; Oct. 26, 1971, 46-99863[U]

Int. Cl.² B60C 25/16

U.S. Cl. 81—15.7 **5 Claims**

1. An apparatus for use in mending a puncture in a tubeless tire, said apparatus comprising:

a driver tool having a handle and a driver-shaped body, a first end of said body being in the form of an awl-like member having an elliptical cross-sectional configuration of decreasing size toward the tip of said first end, said awl-like member having a circumferentially extending grooved portion spaced from said tip, said grooved portion having an elliptical cross-sectional configuration, a second end of said body being connected to said handle, said handle having a recess with an inner wall coaxially surrounding a portion of said body, said inner wall having female threads therein;

a sleeve member having therethrough a longitudinal bore of a size to fit over said driver-shaped body of said driver tool, said sleeve member having at one end thereof male threads of a size to engage with said female threads of said driver tool;

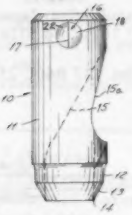
whereby, with said driver tool and said sleeve member coupled such that said male threads of said sleeve member engage said female threads of said driver tool and such that said driver-shaped body of said driver tool extends through said longitudinal bore of said sleeve member, said awl-like member of said driver-shaped body and then said sleeve member may be inserted into a puncture in a tubeless tire, whereafter said driver tool may be manipulated to release the engagement between the female threads thereof and said male threads of said sleeve member, said driver tool may be removed from said sleeve member, said sleeve member remaining in said puncture, and a puncture plug may be inserted into said longitudinal bore of said sleeve member; and

a plug insertion tool having a handle and a shaft member, said shaft member being connected at a first end thereof to said plug insertion tool handle, said plug insertion tool handle having a recess with an inner wall coaxially surrounding a portion of said shaft member, said inner wall of said plug insertion tool having therein female threads of a size to engage with said male threads of said sleeve member, a second end of said shaft member comprising means for forcing a puncture plug further into said sleeve member, whereby said plug insertion tool may be manipulated such that said plug forcing means forces said plug further into said sleeve member, said shaft member being inserted partially into said longitudinal bore of said sleeve member, whereafter said plug insertion tool may be manipulated to engage said female threads thereof with said male threads of said sleeve member, and said plug insertion tool and said sleeve member may be pulled from said puncture, said plug remaining in said puncture, and said shaft member having a length such that when said plug insertion tool and said sleeve member are removed from said puncture said plug will have an outer end portion projecting from the outer surface of said tire.

4,009,625
SELF-STRIPPING PUNCH WITH EARS

Paul D. Pfaff, Bloomfield Hills, Mich., assignor to Bernal Incorporated, Troy, Mich.

Filed Oct. 24, 1975, Ser. No. 625,636
Int. Cl.² B26D 7/26; B26F 1/14
U.S. Cl. 83—97 3 Claims

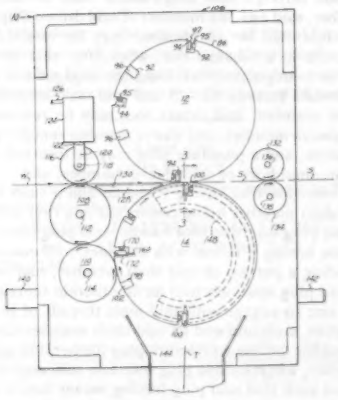


1. In a side outlet, self-stripping punch for mounting in a die board, the combination comprising:
   a. a cylindrical, elongated punch base provided with a cutting edge on the top end thereof;
   b. at least one integral locking ear formed on the periphery of the punch, adjacent the bottom end of the punch, for retaining the punch against rotation in a die board;
   c. said locking ear being provided with a flat face on one side thereof which is disposed on a plane that passes through the longitudinal axis of the punch; and,
   d. said locking ear being formed on the other side thereof in the form on an arcuate web.

4,009,626
VARIABLE ROTARY CUTTER

Richard H. Gressman, 37342 Glenbrook Ave., Mt. Clemens, Mich. 48043

Filed July 9, 1975, Ser. No. 594,294
Int. Cl.² B26D 1/36, 1/40
U.S. Cl. 83—116 8 Claims

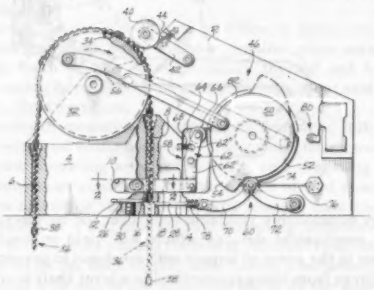


1. A variable rotary cutter for cutting sheets of predetermined lengths from an elongated web of sheet material moving therepast, said cutter comprising
   a frame,
   a pair of substantially cylindrical cutting rolls rotatably mounted in said frame upon parallel axes of rotation and having peripheries disposed in close proximity to one another and defining a web path therebetween,
   each of said rolls having secured to its periphery a plurality of axially extending straight cutting blades mounted thereon parallel to the axis of rotation thereof in circumferentially-spaced parallel relationship and having thereon anvil portions extending between said cutting blades with the cutting edges of the cutting blades of each roll substantially engaging the anvil portions of the other roll in compresssion-cutting relationship therewith,
   each of said rolls having a helical gear drivingly connected thereto,
   each helical gear being disposed in meshing engagement with the other helical gear,
   certain of the cutting blades of each cutting roll coacting with the anvil portions of the opposite cutting roll to compression-cut the opposite ends of workpiece sheets of predetermined circumferential lengths from the web passing therebetween,
   and means operable during rotation of said cutting rolls for adjustably moving one of said helical gears axially relatively to the other helical gear and thereby adjustably rotating one of said cutting rolls relatively to the other cutting roll and consequently varying the circumferential spacing of the straight cutting blades of said one cutting roll relatively to the straight cutting blades of said other cutting roll whereby during operation to adjustably vary the circumferential lengths of the workpiece sheets cut from the web between said straight cutting blades of said cutting rolls.

4,009,627
DEVICE FOR DISPENSING PORTIONS OF A CHAIN

Cliff High, Tacoma, Wash., assignor to Morley Brotman, Tacoma, Wash.

Filed Nov. 3, 1975, Ser. No. 628,399
Int. Cl.² B26D 5/40
U.S. Cl. 83—205 14 Claims



1. A device for dispensing portions of a chain having relatively diametrically enlarged segments at substantially regularly spaced intervals along the length thereof, comprising a pair of collar forming jaws and means for supporting the chain so that it is movable relatively lengthwise thereof through the opening in the collar, the jaws being relatively reciprocably mounted to enable the collar to be opened and closed about the chain, and the opening in the collar having a diameter of less than that of the relatively enlarged segments of the chain in the closed condition of the collar; a chain engaging member relatively reciprocably mounted on one side of the collar, and operable to advance the chain lengthwise in the direction of the collar when said member reciprocates in one direction thereof, and alternately, to undergo slippage lengthwise of the chain, in the direction away from the collar, when said member is reciprocated in the other direction; means operable to sever the chain at a point on the opposite side of the collar; and means interconnected with the jaws, the chain engaging member, and the chain severing means, to actuate the same in two stages, in the first stage of which the actuating means is operable to open the collar and reciprocate the chain engaging member in the one direction thereof, to the extent that a portion of the chain including one segment therein, is fed

through the opening in the collar and assumes a position on the other side thereof, and in the second stage of which, the actuating means is operable to close the collar and actuate the chain severing means, while reciprocating the chain engaging member in the other direction thereof, to tension the chain against the collar.

4,009,628

SYSTEM FOR CUTTING PIECES FROM A TRAVELING STRIP OF SHEET MATERIAL

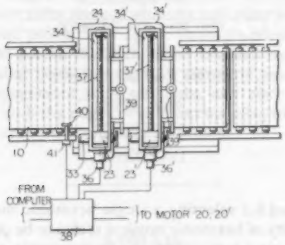
Tetsuji Kato, Otake, Japan, assignor to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

Division of Ser. No. 434,065, Jan. 17, 1974. This application Dec. 16, 1974, Ser. No. 533,182

Claims priority, application Japan, Jan. 18, 1973, 48-8169; Jan. 18, 1973, 48-8170

Int. Cl.² B23D *45/20*

U.S. Cl. 83—294 **7 Claims**



1. An apparatus for cutting a traveling strip of plastic into pieces and comprising a stationary bed positioned under the traveling strip and a pair of units mounted on said bed and through which the strip travels in succession; each unit comprising an upstanding frame mounted on said bed and extending transversely across the strip and which is reciprocative on the bed in the strip's longitudinal direction, said frame having powered means for reciprocating it independently and individually with respect to the corresponding frame of the other unit, and said frame mounting a screw-threaded drive shaft extending transversely across the strip and having a guideway parallel to the shaft and a carriage in screw-threaded engagement with the drive shaft and reciprocatively guided by the guideway to traverse the strip, said drive shaft having a rotary drive motor which is independently and individually operative with respect to the corresponding drive motor of the other unit, a rotary motor and rotary saw assembly being mounted by said carriage with the saw positioned to make a transverse cut in the strip; each of said units being individually reciprocative and its screw-threaded drive shaft drive motor being individually controllable.

4,009,629

APPARATUS FOR CUTTING POLYMER FLAKE

Dorsey O. Thomas, Jr., Chesterfield, and Alvah B. Terry, St. Louis, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed July 28, 1975, Ser. No. 599,809

Int. Cl.² B26D *5/20*

U.S. Cl. 83—355 **1 Claim**

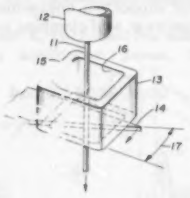
1. A strand granulating apparatus comprising

a. a die having a passageway for forming a strand,

b. a rectangular shear bushing secured to the die in such a position that the strand passes through said shear bushing, the size of the shear bushing relative to the size of the strand forming passageway being such that the strand is free to vary its position at random as it moves through said shear bushing.

c. a rotor, and

d. a cutter mounted on the rotor, said rotor being so positioned that an edge of the cutter cooperates with the edge



of one of the inner surfaces of the shear bushing to sever the strand, said cutter edge being at an angle of 4°–15° to the bushing edge when the strand is severed.

4,009,630

DEVICE WITH MOVABLE END STOP MEANS FOR PIECES OF LUMBER TO BE CUT INTO SHORTER PIECES

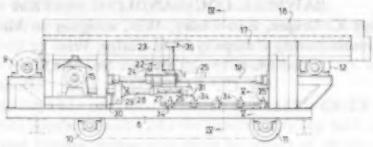
Rolf Ekholm, Nyland, Sweden, assignor to AB Hammars Mekaniska Verkstad, Nyland, Sweden

Filed Sept. 19, 1975, Ser. No. 614,844

Claims priority, application Sweden, Oct. 7, 1974, 7412582

Int. Cl.² B26D *5/28, 7/16*

U.S. Cl. 83—369 **4 Claims**



1. A device having a conveyor with a carrying plane for longitudinal feeding of pieces of lumber against an end stop device with means for adjusting the distance between said end stop device and saw means for cutting off a piece of lumber into several pieces, said end stop device adjusting means comprising:

a slide located under the carrying plane of the conveyor;

a hydraulic device for displacing said slide along a pair of guiding means arranged in the longitudinal direction of the conveyor;

stop means having at least two spaced arms for cooperation with, in the transport direction, the front end of the piece of lumber;

said stop means supported by a horizontal shaft mounted on said slide; and

said horizontal shaft rotatable by hydraulic means for swinging said stop means arms between a first stopping position above said carrying plane and a second position below said carrying plane of the conveyor.

4,009,631

DEVICE FOR HOLDING PIECES OF LUMBER WHEN THEY ARE CUT

Rolf Ekholm, Nyland, Sweden, assignor to AB Hammars Mekaniska Verkstad, Nyland, Sweden

Filed Sept. 19, 1975, Ser. No. 614,845

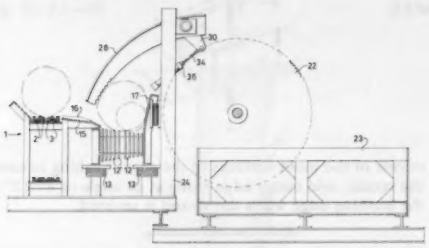
Claims priority, application Sweden, Oct. 7, 1974, 7412581

Int. Cl.² B27B *5/10, 5/18;* **B26D** *5/42*

U.S. Cl. 83—375 **6 Claims**

1. A device for holding pieces of lumber to be cut by movable saw means comprising, a saw blade, a conveyor including transport rollers arranged to support and feed a piece of lumber to a discharge end of the conveyor, said saw means being positioned at said discharge end and movable in a plane trans-

verse to that of the conveyor, at least one clamping arm positioned ahead of said saw means along the feeding direction of the piece of lumber, at least one generally vertical abutment plate positioned for supportive engagement of said lumber disposed on said conveyor, said clamping arm being swingable



in a vertical plane substantially parallel to the plane of movement of the saw means in a direction to and from said abutment plate to clamp and engage the lumber against the abutment plate, said saw blade being movable to a cutting position at a side of the piece of lumber which is opposite to that side engaged by said clamping arm.

4,009,632

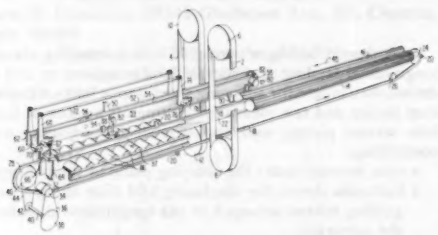
SAWMILL LOG-HANDLING SYSTEM

Robert K. Detjen, Eau Claire, Wis., assignor to McDonough Manufacturing Company, Eau Claire, Wis.

Filed Mar. 10, 1975, Ser. No. 556,836

Int. Cl.² B27B *15/08, 1/00*

U.S. Cl. 83—731 **17 Claims**



1. A sawmill log handling system for advancing logs longitudinally along a given path from an infeed side of a saw, through the saw and to an outfeed side of the saw, said system comprising,

rear log-engaging means for engaging a rearward end of a log,

forward log-engaing means for engaging a forward end of said log,

a lower carrier means for supporting one of said log-engaging means, said lower carrier means being positioned below the given path of the log,

an upper carrier means for supporting the other said log-engaging means, said upper carrier means being an endless member movable in a continuous path and positioned above the given path of the log,

rear drive means for moving a said carrier means to advance the rear log-engaging means along said given path to carry said logs from said infeed side, through the saw and to said outfeed side,

said forward log engaging means engaging a forward end of said log while said log is being moved by said rear drive means, said forward log-engaging means being movable from the infeed side to the outfeed side as the log is cut by the saw, and,

forward drive motor means for moving said carrier means supporting the forward log-engaging means to drive the forward log engaging means forwardly away from the log after the log has passed through the saw.

4,009,633

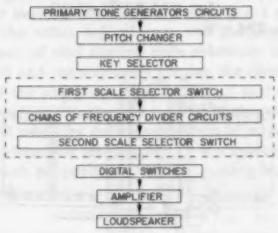
ELECTRONIC MUSICAL INSTRUMENT

Donald K. Coles, 2505 Capitol Ave., Fort Wayne, Ind. 46806

Continuation-in-part of Ser. No. 553,798, Feb. 27, 1975, and a continuation-in-part of Ser. No. 538,012, Jan. 2, 1975, abandoned, which is a continuation-in-part of Ser. No. 496,806, Aug. 12, 1974, Pat. No. 3,943,811. This application Oct. 14, 1975, Ser. No. 622,218

Int. Cl.² G10H *1/00, 5/02*

U.S. Cl. 84—1.01 **7 Claims**



1. A method for selecting a single hexatonic musical scale from a plurality of hexatonic musical scales to be played on an electronic musical instrument, the improvement comprising:

electronically generating at least first and second sets of six primary tone signals, corresponding respectively to the whole tone scale and an irregular hexatonic scale,

the members of said first set of primary tone signals being arranged in a first sequence in order of increasing pitch, with constant intertone intervals of two semitones between consecutive members of said sequence,

the members of said second set of primary tone signals being arranged in a second sequence in order of increasing pitch with at least one intertone interval of one semitone, at least one intertone interval of two semitones, at least one intertone interval as large as three semitones, and a maximum interval of eleven semitones between the first and last members of the sequence,

arranging six chains of frequency divider circuits in a predetermined sequence, each chain of frequency divider circuits having a single audio input lead and a plurality of cascaded frequency divider circuits, each circuit with its individual output lead, successive cascaded circuits producing the input musical tone in descending octave relationship,

selectively coupling one of said sequences of six primary tone signals to the six inputs of said predetermined sequence of six chains of cascaded frequency divider circuits, consecutive members of said sequence of primary tone signals being coupled to consecutive members of said predetermined sequence of chains of frequency divider circuits in order of increasing pitch.

4,009,634

TOGGLE FASTENING DEVICE AND PROCESS FOR ITS MANUFACTURE

Thomas C. Barmore, 4 N. 127 Verrill, Addison, Ill. 60101

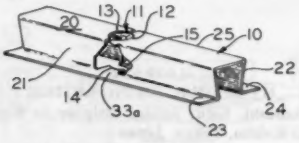
Filed Nov. 14, 1975, Ser. No. 631,953

Int. Cl.² F16B *21/00*

U.S. Cl. 85—3 R **6 Claims**

1. A toggle fastening device comprising an elongated plate in which the central area is raised above the original plane of the plate to form a longitudinal rib having a top and spaced sides and providing side panels which extend in the original

plane of the plate, a central opening in the top of said rib, an opening in each of the sides of said rib, each of said side openings being defined by a cut line extending from said top opening and downwardly to a point on a side panel and a cut line extending from said top line to a point on said side panel which point is spaced from said first mentioned point, tabs extending inwardly from said side panels toward the interior of said rib, said tabs being between and spaced from said points,



said side openings being in communication with said top opening on opposite sides thereof whereby said plate is bendable at areas near said points to bring the ends of said plate forward each other to permit the plate to be inserted through a wall opening smaller than the length of the plate, and a screw in threaded engagement with said tabs and also in threaded engagement with the edges of said top opening when the ends of the plate are in a position of alignment.

4,009,635

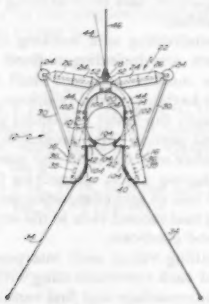
HELICOPTER LAUNCH AND RECOVERY DEVICE FOR HORIZONTAL FLOATING ASW MOBILE TARGETS

James M. Munro, North Kingstown; David L. Ramstad, Portsmouth, both of R.I., and Paul M. Getty, Sunrise, Fla., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 26, 1976, Ser. No. 680,621

Int. Cl.² F41F *5/02*

U.S. Cl. 89—1.5 G **17 Claims**



1. A launch system for mobile targets comprising:

a U frame structure having a plurality of separated U clamps and a strongback connecting said U clamps;

suspension means connected to the front and rear portions of said strongback for suspending said U frame;

bomb shackle means connected to said U frame structure having a plurality of bomb shackles with wire cable attached to said bomb shackles, said wire cables adapted for encircling and holding a mobile target, said bomb shackle means adapted for releasing said wire cables; and

an electrical cable system having a first plurality electrical conductors connected to said bomb shackles and a second plurality of electrical conductors adapted to make a breakaway connection with the mobile target.

4,009,636

HOBBING MACHINE

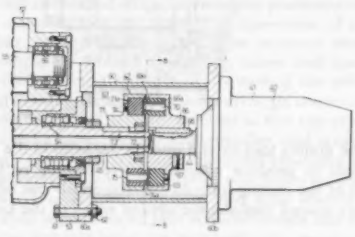
Masato Ainoura, 1253 Eguchi, Kita-Shigeyasu-cho, Miyaki, Saga, Japan

Filed Oct. 8, 1975, Ser. No. 620,784

Claims priority, application Japan, Oct. 19, 1974, 49-120675

Int. Cl.² B23F *11/00*

U.S. Cl. 90—4 **6 Claims**



1. In a hobbing machine having:

a. a tool support member (**22**) operably provided on a machine frame and having a tool support shaft (**24**);

b. a workpiece support member (**26**) operably supported on said machine frame and serving to support a workpiece;

c. a tool (**43**) provided on said tool support shaft and serving to cut the outer periphery of the workpiece;

d. a fluid drive pressure motor provided on said tool support member in the neighborhood of said tool and having a motor shaft (**44**) extending coaxially with said tool support shaft;

e. a coupling (**42**) provided between said motor shaft (**44**) and tool support shaft (**24**) for directly driving said tool (**43**) and having means providing an effect of shock absorption, said means including:

f. a drive coupling member (**66**) secured on the end portion of the motor shaft and having an annular groove (**66***a*);

g. a resilient annular buffer member (**69**) disposed in the annular groove and having a plurality of uniformly spaced drive projections (**69***a*);

h. a driven coupling member (**71**) secured on the end portion of the tool support shaft (**45**) and having an annular groove (**71***a*); and,

i. an annular buffer member (**74**) disposed in the annular groove (**71***a*) of the driven coupling member and having a plurality of uniformly spaced driven projections (**74***a*) engage with the drive projections.

4,009,637

MILLING DEVICE

Hans-Joachim Bittner, Hagen, Germany, assignor to H. Putsch & Comp., Germany

Filed Oct. 7, 1975, Ser. No. 620,291

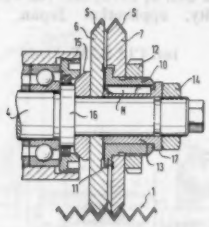
Claims priority, application Germany, Oct. 16, 1974, 2449316

Int. Cl.² B23C *3/00*

U.S. Cl. 90—11 B **16 Claims**

1. Milling device for producing cutting chamfers on knives provided with roof-shaped cutting edges, which milling device comprises a milling arbor; a milling tool clamped to rotate circularly about a central axis of the milling arbor, the milling tool having roof-shaped cutting edges which cut chamfers which are to be produced on the roof-shaped cutting edges of the knives; and at least one further milling tool also having roof-shaped cutting edges, said tool being mounted on the milling arbor with a mounting means for circular rotation about said central axis and for non-rotatable motion relative to the milling arbor but freely movable during cutting along the axis of the milling arbor between limit means on said arbor to self-seek correct axial alignment for an adjacent cutting

edge on the knife; and wherein protrusions and recesses are formed in the mutually facing sides of the two milling tools at least in the region of their cutting edges, and the protrusions



on one milling tool extend into the recesses in the other milling tool to produce alternating overlapping of the cutting edges of the milling tools to simultaneously cut adjacent and closely spaced roof-shaped cutting edges of the knives.

4,009,638

AMMUNITION CONTAINER

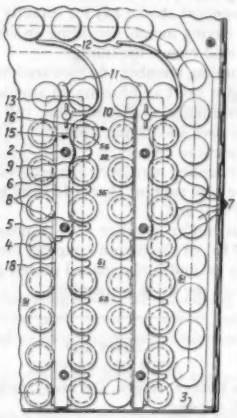
Robert Ramseyer, Versoix, and Hanspeter Novet, Hegnau, both of Switzerland, assignors to Werkzeugmaschinenfabrik Oerlikon-Buhrle AG, Zurich, Switzerland

Filed Apr. 4, 1975, Ser. No. 565,010

Claims priority, application Switzerland, Apr. 10, 1974, 5045/74

Int. Cl.² F41C *25/00*

U.S. Cl. 89—34 **5 Claims**



1. An ammunition container for the reception of a looped cartridge belt, comprising:

a. a container structure;

b. a plurality of supports arranged in said container structure so as to form therein a number of compartments, each compartment containing a loop of the cartridge belt;

c. each support being equipped with spaced teeth extending the length thereof forming a plurality of aligned recesses for receiving cartridges therein;

d. each loop of the cartridge belt consisting of two loop portions, one loop portion bearing against one support of the associated compartment and the other loop portion bearing against an oppositely situated support of such compartment, said loop portion containing a number of cartridges which correspond to the number of recesses in said support; and

e. each recess of the support of each associated compartment having arranged therein a respective cartridge of one loop portion of a loop of the cartridge belt located in such compartment.

4,009,639

HYDRAULIC SWING MOTOR

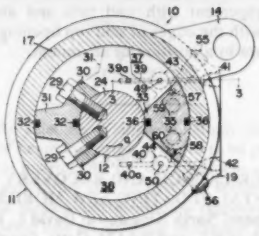
Toshihiko Sabashi, Gifu, Japan, assignor to Kayabakogyo-Kabushiki-Kaisha, Tokyo, Japan

Continuation of Ser. No. 473,440, May 28, 1974, abandoned. This application Nov. 28, 1975, Ser. No. 636,044

Claims priority, application Japan, Aug. 9, 1973, 48-93172[U]

Int. Cl.² F15B *15/22, 13/042*

U.S. Cl. 91—25 **6 Claims**



1. A hydraulic swing motor, comprising

a casing having an annular center portion and two side plates closing opposite ends of said annular center portion;

a shaft journalled in said side plates and being rotatable in said center portion, said shaft defining with said casing a working chamber;

vane means subdividing said working chamber into two compartments and including a fixed first vane and a second vane mounted on said shaft for performing a swing stroke having two end positions;

a pair of hydraulic fluid inlet and outlet passages each having a first end portion commmunicating with the outside of said chamber and a second end portion,

each passage having a port connecting the respective end portion with one of said compartments and positioned to be closed by said second vane as the same approaches the respective end positions;

a pair of throttling valves each interposed in one of said passages and each communicating with one of said compartments intermediate said first vane and the respective end positions of said second vane for permitting only throttled escape of hydraulic fluid from the respective compartment subsequent to closing of the port in said compartment by said second vane;

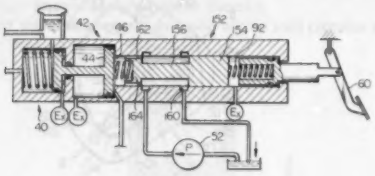
and a pair of relief valves, both mounted within one of said side plates of said casing and each communicating with one of said compartments for limiting the maximum fluid pressure therein whereby, due to the pressure buildup resulting from the throttled escape of fluid subsequent to the closing of a port, a rapid braking of the swing stroke of said second vane occurs, but without danger of damage to said motor since the pressure build-up is quickly limited by the respective relief valve due to the location thereof within said one side wall close to the source of increased pressure and the point of initiation of said maximum fluid pressure.

4,009,640

ANTI-LOCK BRAKE SYSTEM

Yasuhisa Takeuchi, and Haruhiko Iizuka, both of Yokosuka, Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Division of Ser. No. 446,829, Feb. 28, 1974, Pat. No. 3,910,645. This application June 20, 1975, Ser. No. 588,629
Claims priority, application Japan, Mar. 1, 1973, 48-24693
Int. Cl.² F15B *13/042*, *13/14*
U.S. Cl. 91—47 1 Claim



1. In a motor vehicle having a pump means and a reservoir the combination comprising:

a housing forming a power chamber and having an inlet port communicating operating fluid from the pump, and an outlet port in communication with the reservoir;

a piston in said power chamber;

a spool having a passage therein communicating with the power chamber and having axially spaced lands slidingly engaging the housing, the lands and the ports being so constructed and arranged as to provide unrestricted communication between the passage and the outlet port when the spool is in a rest or starting position, whereby the pressure in the power chamber is substantially zero;

means including a continuous pressure of operating fluid in the power chamber and a biasing spring between the piston and spool for biasing the spool to the rest position thereof;

operator actuable means adapted to progressively move the spool relative to the housing to restrict fluid communication of the passage with the reservoir thereby increasing the operating fluid pressure to the power chamber;

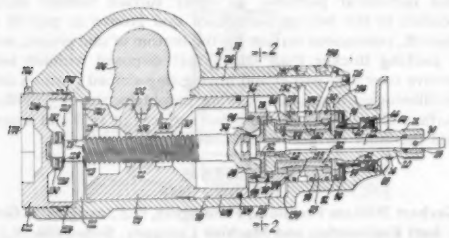
spring means disposed between the spool and the operator actuable means for damping force applied to the operator actuable means by the spool.

4,009,641

COMPACT POWER STEERING GEAR

Robert P. Rohde; John H. Christ, and Stanley E. Anderson, Jr., all of Saginaw, Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Nov. 14, 1975, Ser. No. 631,839
Int. Cl.² F15B *9/10*
U.S. Cl. 91—375 A 5 Claims



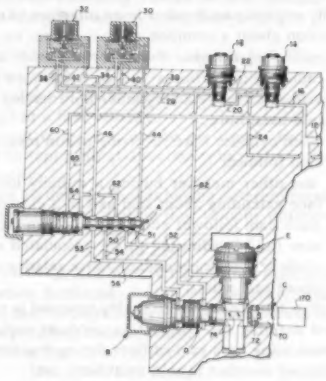
1. A power steering gear unit comprising a housing, an input member operatively mounted for turning movement in said housing and extending outside one end thereof, an output member operatively mounted for turning movement in said housing and extending outwardly therefrom, piston means mounted for longitudinal sliding movement in said housing and cooperating therewith to provide first and second expansible and contractible fluid pressure chambers therein, gear means drivingly connecting said piston means to said output member so that said output member turns in response to sliding movement of said piston means, valve means in said housing operatively connected to said input member and having a connection to a source of pressurized hydraulic fluid for selectively supplying and exhausting pressurized fluid to and from said chambers to hydraulically move said piston means and said connected output member to predetermined positions as controlled by the amount of movement of said input member, axially extending rotatable actuator means extending completely through said piston means and operatively connected thereto for mechanically moving said piston means in said housing, means operatively drivingly connecting said input member to said actuator member so that said actuator member can be turned by said input member, said actuator means having a head portion at one end thereof extending into one end of said valve means, and retainer ring means mounted within said valve means and engaging said head portion to prevent the axial separation of said actuator means and said valve means so that said input can turn said valve means and said actuator member.

4,009,642

DIFFERENTIAL PRESSURE SENSING VALVE

Robert D. Vanderlaan, Kalamazoo, Mich., assignor to Pneumo Corporation, Boston, Mass.

Filed Nov. 6, 1974, Ser. No. 521,262
Int. Cl.² F15B *20/00*
U.S. Cl. 91—464 14 Claims



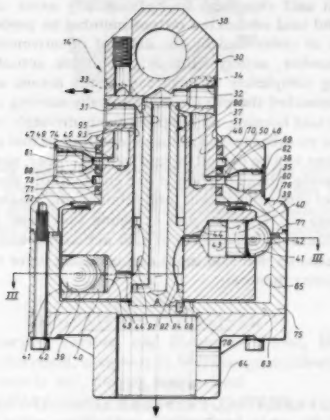
3. A differential pressure sensing valve having a pair of inlet and outlet ports and an axially shiftable spool including axially-spaced land areas on which a pair of pressure sources connectable with said valve through said pair of inlet ports act in the same predetermined direction with spool shifting force, biasing means for biasing said spool in an opposite direction from said pedetermined direction with spool shifting force, means for corresponding increasing the pressure at one of said inlet ports as the pressure at the other of said inlet ports is decreased and vice versa so that the total forces acting on said spool are substantially balanced over the normal operating range of said pressure sources for maintaining said spool in an operating position for normal flow of fluid through said valve between said inlet and outlet ports, and means for unbalancing said total forces acting on said spool for shifting said spool out of said operating position when said pressure sources substantially deviate from their normal operating range for blocking communication between said inlet and outlet ports.

4,009,643

HYDRAULIC MOTOR FOR ROTATING THE BUCKET OF AN EXCAVATING MACHINE

Heinz Thumm, Benzstrasse 9, D-7013 Oeffingen, Germany

Filed Feb. 26, 1975, Ser. No. 553,108
Int. Cl.² F01B *13/06*; B66C *3/02*, *3/16*
U.S. Cl. 91—492 **10 Claims**



1. A hydraulic motor comprising:

a. a first motor member and a second motor member movably engaging each other in an interface of circular cross section about a common axis,

1. said first member being formed with a plurality of radial cylinder bores and an axial bore remote from said interface, each cylinder bore having an orifice in said axial bore,

2. each cylinder bore receiving piston means including a cam follower,

3. the other member having a radially undulating cam face extending about said axis in a closed loop,

4. each cam follower engaging said cam face when pressure fluid is admitted to the associated cylinder bore while said motor members move relative to each other about said axis;

b. a distributor member rotatably received in said axial bore and defining two connecting conduits sequentially communicating with said orifices during rotation of said distributor member in said axial bore; and

c. coupling means coupling said distributor member to said second motor member for joint rotation about said axis while permitting limited radial and axial movement of said distributor member relative to said second motor member,

1. one of said motor members being formed with two first accessible ports permanently communicating with said two connecting conduits respectively,

2. each of said motor members being formed with two second accessible ports, two recesses in said interface, and two ducts respectively connecting said second ports to said recesses,

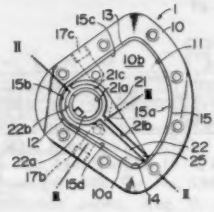
3. each of said recesses permanently communicating with a corresponding recess in the other motor member in such a manner that said ducts and said recesses constitute two separate passages connecting the second ports of said first motor member to the second ports of said second motor member respectively.

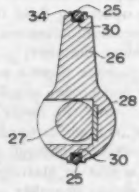
4,009,644

ROTARY ACTUATOR

Yasuo Higuchi, and Yosio Mitumura, both of Komaki, Japan, assignors to Chukyo Electric Co., Ltd., Japan

Continuation-in-part of Ser. No. 378,497, July 12, 1973, abandoned. This application Apr. 2, 1975, Ser. No. 564,445
Claims priority, application Japan, July 14, 1972, 47-69927
Int. Cl.² F01C *9/00*
U.S. Cl. 92—125 **2 Claims**





1. In a rotary actuator having a sectoral sectioned cylinder with two ends and larger and smaller circumferential inner surfaces opposing each other and having the same center of curvature in common and different radii of curvature, a pair of end covers for closing tightly the ends of said cylinder, a shaft concentric with said curvature and supported rotatably by the end covers, and a vane secured to said shaft and pivotally movable within said cylinder, the improvement which comprises the combination of a sectoral cylindrical seal member of a predetermined thickness disposed within said cylinder in contact with the inner surfaces thereof, said seal member having a sectoral section similar to that of said cylinder, said seal member having a normal length greater than that of the cylinder and having squared edge portions, said seal member being compressed uniformly along the normal length in the axial direction by said end covers, the outer peripheral surface of said seal member not being fixed to the inner surfaces of said cylinder, a relatively thin gasket of elastic material and flat surfaces disposed within a groove around the entire periphery of said vane, said gasket having ring-shaped portions and rectilinear portions, an inner surface thereof being bonded to the bottom surface of said groove to provide a smooth, continuous surface for the bottom of said groove, and a packing thicker than said gasket disposed withinin said groove over said gasket and having ring-shaped portions and rectilinear portions, said packing sealably contacting another surface of said gasket, the inner surfaces of said end covers and the inner surface of said seal member.

4,009,645

PISTON PUMP

Gerhart William Freimuth, Flemington, N.J., assignor to Gerhart Engineering and Machine Company, Somerville, N.J.

Filed Nov. 3, 1975, Ser. No. 628,349
Int. Cl.² F16J *1/06*
U.S. Cl. 92—202 **4 Claims**

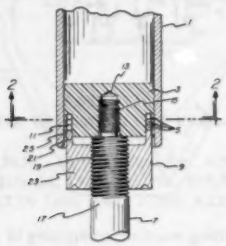
1. A piston pump comprising:

a cylindrical sleeve member having an interior cylindrical wall;

a plunger head of resilient material having an outside diameter of such dimension to permit said plunger head to be slidable within and guided by the interior wall of said cylindrical sleeve member, an upper transverse face and a lower transverse face, a longitudinal circular aperture radial with and extending axially from said lower transverse face into said plunger head, and a hole centrally located upon and extending axially from said lower transverse face into said plunger head;

a piston rod having an end mounted within said hole of and rigidly connected to said plunger head, and a threaded portion immediately adjacent thereto;

resilient material means contained within said circular aperture; and



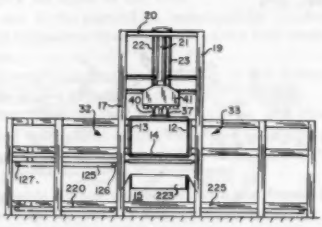
a cylindrical pressure cap having an uppermost cylindrical end portion dimensioned to be slidably engaged in said circular aperture of said plunger head, and a lowermost solid bar-like portion with a centrally located threaded axial hole for mounting upon said threaded portion of said piston rod below said plunger head, thereby permitting the pressure cap to be selectively manually turned for positioning said cap without removing the plunger head from said cylindrical sleeve to apply even and continuous pressure upon said resilient material means, expanding said resilient material means to force the adjacent portions of said plunger head to "seal" against the interior wall of said sleeve member, preventing the escape of a product contained within said sleeve member above said plunger head.

4,009,646

METHOD OF AND APPARATUS FOR RAPIDLY LINING CONTAINERS

William E. Mott, 215 Wilson Downing Road, Lexington, Ky. 40507

Filed July 2, 1975, Ser. No. 592,612
Int. Cl.² B31B 7/02
U.S. Cl. 93—36.01 **20 Claims**



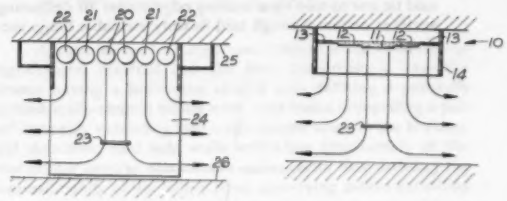
1. A method of automatically lining an open-top container comprising, moving an empty unlined container to a lining station below a panel-grasping mechanism and thereafter moving the lined continer from said station, horizontally moving a flat bottom liner panel to said station, dispensing side and end lining panels from four separate storage racks extending horizontally from said station, grasping each of two end panels, two side panels and one bottom panel with said panel-grasping mechanism, bringing said panels into contact with each other in the form of an open-top, box-like array above said container, moving said array downwardly into said container, releasing the panel-grasping mechanism from said array, thereafter moving the released mechanism upwardly from the lined container, and automatically conducting the above-recited steps of operation in accordance with a preferred program of interrelated steps.

4,009,647

CLEAN AIR ZONE FOR SURGICAL PURPOSES

Frederick Hugh Howorth, Chorley, England, assignor to Howorth Air Engineering Limited, Bolton, England

Filed Apr. 16, 1975, Ser. No. 568,614
Claims priority, application United Kingdom, Apr. 26, 1974, 18303/74
Int. Cl.² F24F 9/00
U.S. Cl. 98—36 **2 Claims**



1. Apparatus for providing a clean air zone around a patient undergoing surgery comprising:

a plurality of air delivery means,

a plurality of air supoly means for supplying sterile air to the air delivery means,

a first central one of the air delivery means being adapted to supply air at a first velocity,

and a second outer one of the air supply means being adapted to supply air at a second velocity lower than the first velocity,

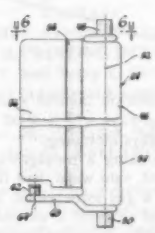
the different air delivery means having different permeabilities for attaining the desired flow velocity differential.

4,009,648

AIR CONDITIONER AIR FLOW CONTROL MECHANISM

Ralph S. Braden, Bellbrook; Edgar W. Stienecker, and John Weibel, Jr., both of Dayton, all of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Oct. 3, 1975, Ser. No. 619,198
Int. Cl.² F24F 3/00, 13/08
U.S. Cl. 98—40 V **1 Claim**



1. In a room air conditioner front and grill assembly having sweep air deflecting structure including a tie bar adapted to be oscillated in the direction of its length and pivotally oscillatable air deflecting vanes engaged in oscillatable driven rela-

tion with said tie bar to direct air flow from said assembly in a sweeping movement when said tie bar is oscillated and air is flowing through said assembly, the improvement comprising:

each of said vanes having a planar main body section provided with pivot supports and defining the leading edge portion of the vane, a drive arm attached to said main body section and to said tie bar for transferral of linear oscillating movement of said tie bar into pivotally oscillating vane movement, and a trailing edge planar air deflecting section attached to said main body section by a flexibly yieldable hinge section having a normal position maintaining said vane sections in a predetermined planar relation and resisting hinge movement from said normal position by air impingement but flexibly yielding under potentially damaging outside force application to said trailing edge planar air deflecting section to protect the vane and tie bar from damage by such outside force application,

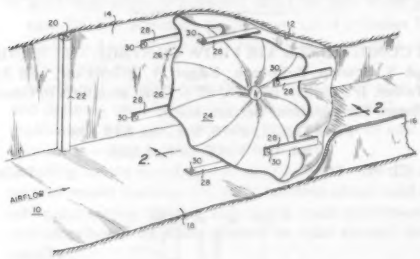
said trailing edge planar air deflecting sections being connected to said drive arms only through said flexibly yieldable hinge sections and said planar main body sections whereby all transferral of linear oscillating movements of said tie bar to said vane trailing edge planar air deflecting sections occurs through said flexibly yieldable hinge sections.

4,009,649

MINE VENTILATION CONTROL DEVICE

Edward D. Thimons, Tarentum, and Fred N. Kissell, Pittsburgh, both of Pa., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Apr. 2, 1976, Ser. No. 672,901
Int. Cl.² E21F *17/00, 1/14*
U.S. Cl. 98—50 **7 Claims**



1. In a mine ventilation control system for underground mines having passageways which must be blocked to form suitable air passageways including:

a stopping for blocking a passageway by forming a seal between the roof, side walls, and floor surfaces thereof, and formed of a gas impervious, fire-resistant, flexible sheeting material adapted to extend in gas-tight relation between the roof, side walls, and floor surfaces of the mine passageway,

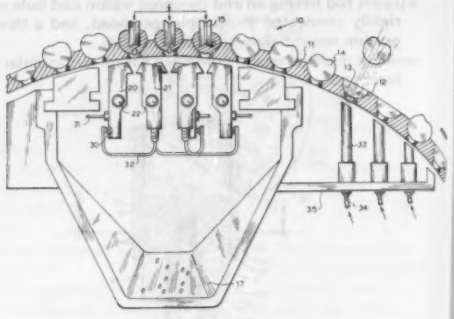
and frangible means for securing said stopping in the passageway, said frangible means capable of breaking away by a force less than the force necessary to damage the flexible sheeting material of said stopping.

4,009,650

FRUIT PITTING MACHINE

Daniel J. Lascelles, Deland, and Dexter Spear French, Jr., Longwood, both of Fla., assignors to Dunkley Company, Kalamazoo, Mich.

Filed Sept. 22, 1975, Ser. No. 615,602
Int. Cl.² A23N *3/00*
U.S. Cl. 99—490 **15 Claims**



1. A fruit pitting machine comprising in combination:

fruit positioning support means for positioning and supporting fruit for pitting;

pitting means for removing pits from pit containing fruit supported by said fruit positioning and supporting means, said pitting means having a plurality of pitting needles each having a predetermined shape for driving a pit from the unpitted fruit;

a plurality of jaws located adjacent said pitting means, at least one said jaw associated with each pitting needle and being shaped to receive said needle and to be moved by a fruit pit being removed from a piece of fruit;

signal generating means coupled to said jaws and being actuated by movement of said jaws;

control means coupled to said signal generating means and actuated by movement of said jaws to generate an output control signal responsive to the absence of a fruit pit moving a jaw; and

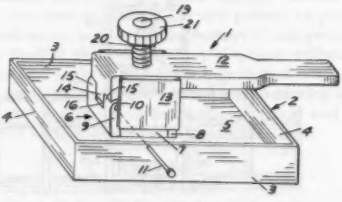
a fruit separating means operatively connected to said control means to separate a piece of fruit upon control of said actuation means, whereby unpitted fruit is detected and separated in said fruit pitting machine.

4,009,651

NUTCRACKER

Fred M. Adams, 143 Carroll St., Shreveport, La. 71105

Filed Nov. 3, 1975, Ser. No. 628,426
Int. Cl.² A23N *5/00*
U.S. Cl. 99—579 **10 Claims**



1. A nutcracker comprising:

a. a tray having a pair of opposed upwardly extending sides and ends and an essentially flat bottom;

b. a cracking block carried by said tray and having an upward standing generally flat forward base member and an upward standing generally flat rear base member adjacent said cracking block, said forward base member and said

rear bone member being in essentially parallel relationship to each other and separated by said cracking block; and

c. a cracking lever hingedly mounted on said forward base member and having a pair of downwardly extending, spaced apart cracking lever flanges which are shaped and positioned to cooperate with said cracking block to define a closed nutcracking chamber when said cracking lever is closed over said cracking block.

4,009,652

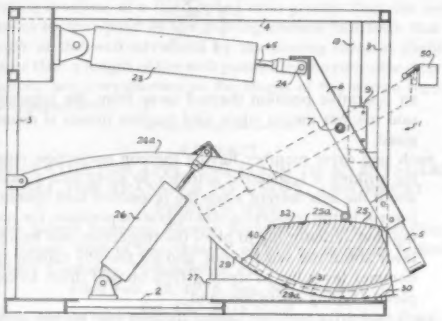
APPARATUS FOR TRIMMING FAT FROM A BOSTON STYLE BUTT

John Anderson, 13030 - 65 St., Edmonton, Alberta, Canada

Filed July 24, 1975, Ser. No. 598,887

Int. Cl.² A23N *7/00;* **A47J** *17/00;* **A22B** *5/16*

U.S. Cl. 99—590 **4 Claims**



1. Apparatus for severing a layer of back fat from a Boston style pork shoulder butt having lean and fat portions, comprising:

a frame;

a saddle element associated with the frame for supporting the butt in position to be severed longitudinally along a path substantially parallel to the fat – lean interface, said saddle element having a curved support surface contoured to substantially conform with the outer surface of the back fat layer of the butt;

an arcuate knife curved to substantially conform to the curved transverse interface line of the lean meat and back fat layer;

means pivotally mounting the knife on the frame so that it can be drawn through the butt;

means for rotating the knife about an axis fixed during pivoting movement of the knife and generally parallel to the support surface of the saddle along an arc through the butt; and

disengageable means associated with the frame for clamping the butt against the support surface during the severing operation;

said apparatus being operative to move the knife through the butt to cut a layer of back fat of varying thickness therefrom while leaving a layer of back fat of substantially constant thickness adhering to the lean meat.

Also enclosed, for purposes of the record, are photostatic copies of two letters which were shown to the Examiner during the interview.

4,009,653

MACHINE FOR FORMING A ROUND BALE OF FIBROUS AGRICULTURAL MATERIAL

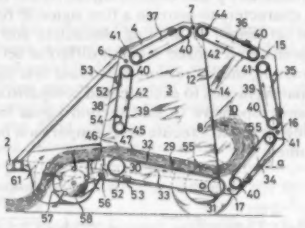
Hans Otto Sacht, Wolfenbuttel, Germany, assignor to Gebrueder Welger, Wolfenbuttel, Germany

Filed Sept. 10, 1975, Ser. No. 612,104

Claims priority, application Germany, Sept. 13, 1974, 2443838

Int. Cl.² B30B *5/06;* **A01D** *39/00*

U.S. Cl. 100—88 **13 Claims**



1. A machine for forming round bales of windrowed fibrous agricultural material and the like, comprising a cage-like frame having a horizontal central axis defining a generally cylindrically-shaped baling zone, said frame comprising a pair of upwardly extending side walls spaced apart in the horizontal direction, said side walls extending transversely of the horizontal central axis of the baling zone and defining the opposite ends of the baling zone, conveying means extending between said side walls, said conveying means comprising a bottom conveyor means for receiving the agricultural material as it enters the baling zone and a plurality of serially arranged conveying elements for receiving the agricultural material from said bottom conveyor member, and means for driving said conveying means in the direction defining the generally cylindrical circumferential periphery of the baling zone, wherein the improvement comprises that said conveying elements are fixably journalled to the frame and stationarily mounted on said frame relative to each other during the bale forming operation and are disposed around approximately the full extent of the generally cylindrical periphery of the baling zone from said bottom conveyor member, on one side of the baling zone below the horizontal central axis thereof, the last one of the serially arranged said conveying elements from said bottom conveyor member is disposed directly above and spaced vertically apart from said bottom conveyor member in the generally cylindrical peripheral direction of the baling zone from said bottom conveyor member, and forms therewith an inlet opening into the baling zone, and each said conveying element comprises a plurality of belt-like conveyors each having a first end a second end spaced apart in the generally cylindrical peripheral direction of the baling zone.

4,009,654

AUTOMATIC MODIFICATION OF THE PRINT CONTROL IN A PRINTING DEVICE

Samuel C. Harris, Jr., and Terry L. Hewitt, both of Waynesboro, Va., assignors to General Electric Company, Waynesboro, Va.

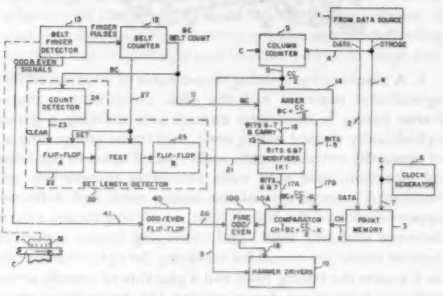
Filed Dec. 20, 1974, Ser. No. 534,600

Int. Cl.² B41J *5/30*

U.S. Cl. 101—93.09 **13 Claims**

1. A print selection system for a printer wherein said printer has a plurality of printing characters in selectable set lengths and means for effectively moving said printing characters during printing such that they appear as a sequence of individually different printing characters moving from column to column along a print line, said print selection system comprising memory means for storing a plurality of numerical representations wherein said representations represent numerals of

a predetermined code having a range of code values representing an input character, means for providing numerical signals identifying each moving printing character position, means for providing respective column indicating signals for each of said input characters having a numerical value defining the desired column location where such input characters are to be recorded, means for comparing said stored numerical representations and said column signals and said position signals to detect input characters to be recorded, means responsive to the column signal associated with such detected input character to cause printout of such input character in the column indicated by said column signal, means for sensing said printing characters to provide a first signal in response to a sensed first set length of printing characters and a second signal in response to a sensed second, different set length of printing characters, means responsive to said first signal causing said comparing means to execute said comparison in a first manner, means responsive to said second signal for causing said comparing means to execute said comparision in a second different manner.



13. In an arrangement wherein a plurality of recording characters, grouped into a given number of sets of such characters of selectable set length on a carrier, are adapted for presentation in a given order to the lines on a record medium containing column locations for purposes of recording on such lines in accordance with a pattern of input data and a pattern of associated column location signals available from a source, means for producing first signals identifying the recording characters appearing at the various columnar locations on said record medium, means for processing said input data, column location signals and said first signals in a given manner to provide second signals, means responsive to said second signals for selectively causing the recording of particular recording characters during the various columnar locations of said recording characters, means for automatically sensing a change in the number of recording characters included in at least one of said number of sets, and means responsive to said sensed change for automatically modifying said given manner of processing to provide a corresponding change in said second signals.

4,009,655

PRINT HAMMER ACTUATION DEVICE

Toru Matsubara, Chofu; Toshikazu Nakano, Fuchu, and Kazuo Nomura, Chofu, all of Japan, assignors to Tokyo Juki Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed July 7, 1975, Ser. No. 593,532

Int. Cl.² B41J 9/36

U.S. Cl. 101—93.31 **3 Claims**

1. A typewriting device comprising:

a continuously driven type carrying drum;

a plurality of hammer levers pivotally mounted about an axis parallel to the axis of said drum, each said hammer lever having a lug thereon;

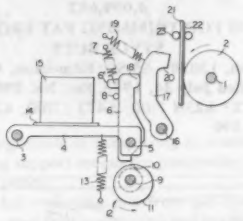
a plurality, equal in number to the number of said hammer levers, of operation levers pivotally mounted about an axis parallel to the axis of said drum;

a plurality of actuators, one each pivotally mounted on a respective one of said operation levers, each said actuator having a lug contacting a respective one of said hammer levers;

a plurality of normally energized magnet means, one each mounted adjacent a respective one of said operation levers, for normally urging said operation levers into magnetically attracted inoperative positions, each said magnet means being selectively deenergizable for a typing operation;

a plurality of drive members, one each positioned adjacent a respective one of said operation levers and a respective one of said actuators, said drive members being continuously driven in synchronization with said drum about an axis parallel to the axis of said drum;

a plurality of biasing means, one each connected to a respective one of said operation levers, for urging each said operation lever from said inoperative position thereof to



an operative position thereof away from the respective said magnet means when said magnet means is deenergized;

each said drive member having thereon projection means for striking a respective actuator to pivot said actuator about the axis thereof when the respective said operation lever is in the respective said operative position, for causing said actuator lug to pivot the respective said hammer lever about the axis thereof, and for thereby causing said hammer lever lug to strike a type on said drum to complete a typing operation; and

each said drive member having thereon cam means, eccentric with respect to said drive member axis, for moving the respective said operation lever against the respective said biasing means from said operative position thereof back toward the respective said magnet means, whereby said magnet means upon being energized after completion of a typing operation moves said operation lever back to said inoperative position thereof.

4,009,656

CLOTH PRINTER AND METHOD WITH FEEDER ENGAGING WARP THREADS

Jacobus Gerardus Vertegaal, Boxmeer, Netherlands, assignor to Stork-Brabant B.V., Boxmeer, Netherlands

Filed Nov. 13, 1974, Ser. No. 523,539

Claims priority, application Netherlands, Nov. 14, 1974, 7415628

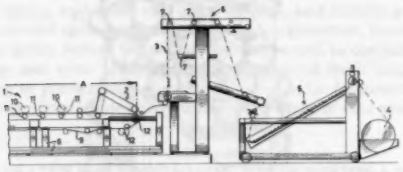
Int. Cl.² B41F 15/24; B65H 17/38

U.S. Cl. 101—129 **12 Claims**

1. An apparatus for printing cloths which are interconnected by intermediate strips consisting of warp threads to define a continuous web having a woven repeat comprising a rotary screen printing machine having an endless belt movable along a path, a rotatable cylinder stencil having a print pattern thereon less than the circumference of said stencil and positioned on the path to print the web moved along said path by the endless belt, the belt and stencil being drivingly connected, feeder means for feeding said continuous web to said rotary screen printing machine, said feeder means including means projecting between the warp threads and thereby en-

gaging the intermediate strips of said web, and means for driving said feeder means in synchronism with the movable endless belt of the rotary screen printing machine at a fixed speed ratio greater than one so that a length of the web advanced by said feeder means is slightly longer than the length of the print pattern on the rotatable stencil whereby any irregularities in the length of the woven repeat in the cloths and intermediate strips are compensated.

11. A method for printing cloths which are interconnected by intermediate strips consisting of warp threads so as to form a continuous web having a woven repeat, the steps of feeding



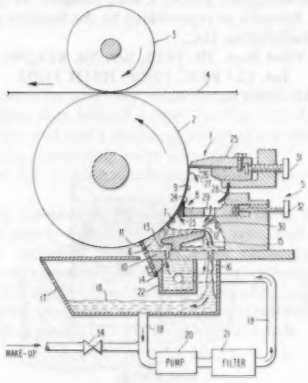
the web continuously to a rotary screen printing machine having an endless belt moving along a path and at least one cylindrical stencil positioned on the path and driven at a predetermined rotary speed, the stencil having a print pattern thereon less than the circumference of the stencil, applying a driving force to the intermediate strips to feed the web to the printing machine at a fixed speed ratio greater than one with respect to the speed of the moving endless belt such that a length of the web advanced by the driving force is slightly longer than a length of the web printed by the rotatable stencil whereby any irregularities in the length of the woven repeat are compensated.

4,009,657

APPARATUS FOR APPLYING FLUID TO AN INTAGLIO ROLL FOR TRANSFER TO A SOFT, ABSORBENT FIBROUS WEB

Frank Joseph Bonanno, Secane; Richard B. Kaiser, and Pieter J. Kroon, both of Swarthmore, all of Pa., assignors to Scott Paper Company, Philadelphia, Pa.

Filed Feb. 25, 1975, Ser. No. 552,948
Int. Cl.² B41F *9/10*
U.S. Cl. 101—157 **14 Claims**



1. Apparatus for applying fluid to fluid carrying recesses of an intaglio roll for subsequent transfer to a soft, absorbent fibrous web passing in contact with the intaglio roll, the apparatus comprising:

a. confining members forming a small unpressurized reservoir of the fluid extending across the width of the intaglio roll, the confining members comprising,

i. a portion of the intaglio roll,

ii. a level control member spaced from the intaglio roll and over which the fluid flows continuously out of the reservoir,

iii. a sealing member positioned close to the intaglio roll below the surface of the reservoir, and

iv. end confining members sealingly engaging the level control and sealing members at the ends of the reservoir, the upper surface of said fluid reservoir extending from the intaglio roll and being always open to the atmosphere;

b. means for flowing the fluid upwardly through the reservoir at uniform velocity profile across the width of the reservoir;

c. means for rotating the intaglio roll upwardly through the reservoir, whereby a first layer of the fluid is adhered to the roll and lifted above the reservoir;

d. pre-wipe means positioned axially across the surface of the intaglio roll above the reservoir for forcing the fluid into the fluid carrying recesses, for establishing a reformed, thinner and more uniform layer of the fluid adhering to the intaglio roll above the pre-wipe means, and for wiping from the roll a portion of the fluid in the first layer; and

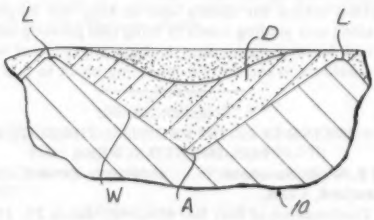
e. a doctor blade positioned against the intaglio roll above the pre-wipe means for removing essentially all of the remaining fluid adhering to the intaglio roll except the fluid within the fluid carrying recesses.

4,009,658

FLUID METERING ROLL AND METHOD OF MAKING THE SAME

Charles R. Heurich, Hanover, N.J., assignor to Pamarco Incorporated, Roselle, N.J.

Filed Apr. 26, 1974, Ser. No. 464,692
Int. Cl.² B41F *31/26*
U.S. Cl. 101—348 **7 Claims**



1. As a new article of manufacture, a durable metering roll for the application of ink and like fluids having isolated peripheral metering cells of a predetermined volumetric capacity, comprising a cylindrical metal core, said core having formed in its periphery a multiplicity of substantially regularly spaced-apart receiver cells entirely surrounded by land portions defined by the periphery of said core, said receiver cells being of a first volume exceeding said predetermined volume, said receiver cells being in the general form of inverted pyramids having their base portions coincident with said periphery and including side walls inclined at an acute angle to the surface of said periphery, said angle not exceeding about 36°, and a continuous plasma spray ceramic coating covering said periphery and the exposed surface of said cells, the exposed surface of said coating defining outwardly directed metering cells the side walls of which are inclined with respect to said periphery at an angle substantially more acute than the comparable angle between said cylindrical surface and the walls of said receiver cells, the volume of said metering cells being about one fifth or less of the volume of said receiver cells.

4,009,659

MECHANISM FOR SECURING PRINTING PLATE CLAMPING DEVICES ON FORME CYLINDERS

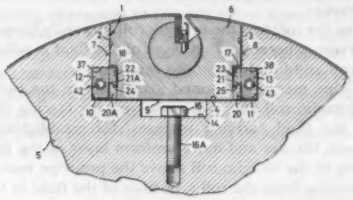
Georg Schneider, Wurzburg, Germany, assignor to Koenig & Bauer Aktiengesellschaft, Wurzburg, Germany

Filed July 14, 1975, Ser. No. 596,030

Claims priority, application Germany, Aug. 8, 1974, 2437758

Int. Cl.² B41F 27/06

U.S. Cl. 101—415.1 9 Claims



1. A mechanism for securing a mounting block for a printing plate clamping device on a forme cylinder, comprising:

a groove formed in said forme cylinder parallel to the axis thereof;

a mounting block positionable in said groove, said mounting block having a cross-section similar to the cross-section of said groove, said mounting block further including a longitudinally extending notch and a plurality of spaced vertical notches defining a plurality of spaced locking shoulders;

a guiding notch formed in a wall of said groove and extending longitudinally of said groove;

a locking bar mounted in and longitudinally slidable within said guiding notch, said locking bar carrying a plurality of spaced locking pieces, said locking pieces extending into said mounting block notches, said locking pieces having inclined pressing surfaces engagable with said mounting block locking shoulders; and

locking means for sliding said locking bar longitudinally along said guiding notch to bring said pressing surfaces of said locking pieces into locking engagement with said shoulders to secure said mounting block in said groove.

4,009,660

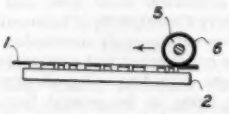
INKING IN LITHO PRINTING THROUGH A NON-IMAGED SCREEN

John B. Wells, Savannah, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 456,349, March 29, 1974, abandoned. This application Nov. 10, 1975, Ser. No. 630,838

Int. Cl.² B41M 1/08; B41F 31/22

U.S. Cl. 101—450 9 Claims



1. A method of selectively reinking a lithographic image on a master having residual ink on its image areas after transfer of an image to a receiving member comprising providing a non-imaged screen being a web with openings or pores extending through to both sides and the web being coated with an ink releasing silicone elastomer, interposing said screen between and in contact with said master and an inking member containing a viscous lithographic ink and passing ink through the pores of said screen from the inking member to the image whereby only the imaged portions of said master receive ink.

4,009,661

MISSILE WARHEADS

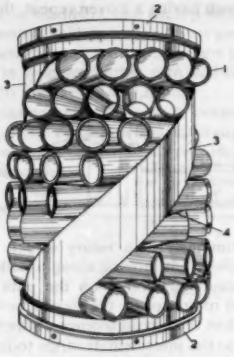
Imrie Dodd, 110, Brampton Road, Bexley Heath, Kent, England

Filed Oct. 24, 1958, Ser. No. 769,510

Claims priority, application United Kingdom, Oct. 24, 1957, 33308/57

Int. Cl.² F42B 13/50

U.S. Cl. 102—61 4 Claims



3. A missile warhead having a plurality of projector tubes, a pair of projectiles arranged back to back within each projector tube, each projectile having a plurality of spaced integral tongues extending longitudinally rearward thereof in normal unrestricted alignment, the tongues of the back to back projectiles formed to interfit into the spaces between the tongues of the other a propellant charge within the interfitting tongues, means for igniting the propellant charge to discharge the projectiles in opposite directions, said tongues being bendable outwardly under the action of the propellant gases upon leaving the projector tube to form stabilizing fins for the projectiles.

4,009,662

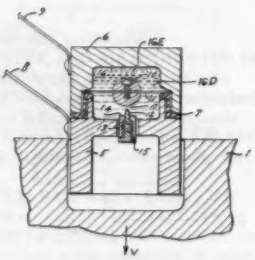
DISCRIMINATING SENSOR FOR CONTACT FUZING

Carlo Riparbelli, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Sept. 29, 1975, Ser. No. 618,306

Int. Cl.² F42C 19/06; H01H 35/02

U.S. Cl. 102—70.2 R 5 Claims



1. A contact fuzing sensor for a missile having a solid cone front end operating as a plunger and attached at its rear end to a shell constituting the vehicle's structure comprising a conducting base forming the rear end of said plunger, said conducting base having a top portion, a conducting cover for said base, said cover having a top portion, a insulating sleeve separating said base from said cover, said cover and insulating sleeve, in combination, forming therein a sealed cavity, first

and second external electrical leads for said conducting base and conducting cover, respectively, a first spring having first and second ends and attached electrically at each of said ends to the opposite respective sides of said conducting cover in approximately the center portion of said cavity, a mass attached to and suspended from said first spring at the center portion of said spring, a guide busing in the center of said top portion of said conducting base extending up into said cavity, a slidable contact probe inserted in said guide bushing extending into said cavity, a second spring keeping said probe in place, a screw to adjust the pressure upon said second spring and also to adjust a gap between said probe and said mass; said first spring, said mass, said guide bushing, said slidable probe, said second spring, and said screw, in combination, forming a mass-spring system for said cavity, and means to controllably damp said mass attached to and suspended from said first spring to prevent said gap from closing under frequently occurring perturbations and vibrations in flight of said missile.

4,009,663

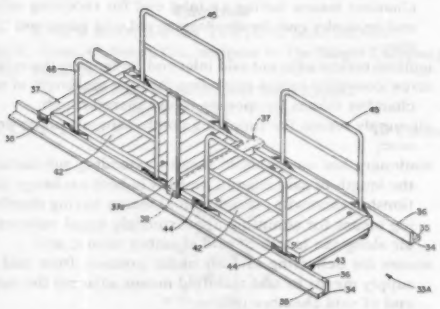
APPARATUS FOR POSITIONING BALES WITHIN A BALE ASSEMBLY AREA

Alex Jacques Keller, 2222 Scottwood Drive, Gastonia, N.C. 28052

Division of Ser. No. 507,792, Sept. 20, 1974, Pat. No. 3,951,282, which is a division of Ser. No. 409,297, Oct. 24, 1973, abandoned. This application Dec. 29, 1975, Ser. No. 644,828

Int. Cl.² B61K *7/16*

U.S. Cl. 104—1 R **7 Claims**



1. Apparatus for precisely positioning cubical bales within a bale assembly area behind a fiber feeding machine having a hopper at one end and a discharge outlet at the other end, said apparatus for positioning bales comprising:

a. means for moving successive bales into said assembly area,

b. means for precisely positioning the bales at predetermined points within the assembly area, said positioning means including guide means for confining said bale within a predetermined dimension extending perpendicular to the width of said bale, and including stop means for confining said bale within a predetermined dimension extending parallel to the length of said bale.

4,009,664

CLOSURE ACTUATING DEVICE FOR RAILWAY HOPPER CAR DOORS

Joseph G. Fearon, Boise, Ohio, assignor to Morrison-Knudsen Company, Inc., Boise, Idaho

Filed Mar. 12, 1975, Ser. No. 557,591

Int. Cl.² B61D *7/06, 7/18, 7/26, 49/00*

U.S. Cl. 105—239 **2 Claims**

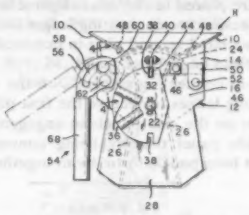
1. A discharge control door assembly for controlling discharge of particulate material from a hopper car having side walls and a bottom wall, comprising:

opposed sloping extension plates extending from longitudinal discharge openings formed in the bottom wall of the hopper car having terminating edges forming a discharge opening in the bottom wall of the hopper car,

parallel support plates extending downwardly from the opposite sides of the discharge opening transverse to the extension plates, each support plate including an upper portion and a lower portion,

means at one side of each of the support plates hinging the lower portion of the support plate to the upper portion,

a discharge control door assembly including a segment having an upper arcuate surface supported by the lower plate for rotation about a pivotal axis extending parallel to the length of and beneath the discharge opening equi-



distantly from the terminating edges of the extension plates, the control door assembly rotatable between a closed position wherein the segment covers the discharge opening and an open position wherein the segment uncovers the discharge opening an amount depending on the degree of rotation for discharge of material from the hopper car through the discharge opening, and

means at the other side of each of the support plates connecting the lower portion to the upper portion for shifting the pivotal axis downwardly in relation to the upper portion to allow the upper arcuate surface of the discharge control door assembly to lower and increase the clearance between the arcuate surface and the terminating edges of the extension plates.

4,009,665

SHELF ASSEMBLY

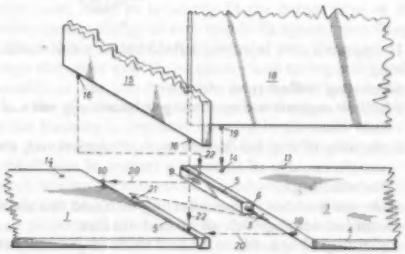
Andreas Weisheit, Rosenweg 4, 5974 Herscheid, Germany

Filed Aug. 21, 1975, Ser. No. 606,579

Claims priority, application Germany, Aug. 24, 1974, 7428708[U]

Int. Cl.² A47B *47/04*

U.S. Cl. 108—111 **10 Claims**



1. A shelf assembly comprises a plurality of base panels having abutment sides and side panels having upper and lower edges with first plug-in connecting elements on the upper and lower edges,

the base panels having on their respective abutment sides a connecting ledge having a lateral surface on which is

located a first sliding connector element, the connecting ledge extending from one edge of the base panel towards the centerline thereof and terminating short of the opposite edge of the base panel in a front face having a second plug-in connecting element thereon, thereby leaving a portion of the abutment edge clear of said connecting ledge, the base panels further having on their respective abutment sides, in the portion thereof which is clear of the connecting ledge, a complementary second sliding connector element,

each of said first and second connector elements being one of an oblong hole and a peg respectively, and located a corresponding distance from its respective base panel edge so as to permit sliding engagement of said sliding connector elements with each other when adjacent base panels are placed in coplanar alignment so that the front faces of respective connecting ledges face each other and their associated second plug-in connecting elements are brought into engagement, and

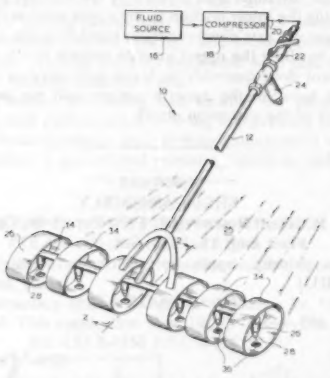
third plug-in connecting elements on the side faces of the connecting ledges to receive the first plug-in connecting elements on the side panels in engagement therewith, a given side panel thereby being connected to both of adjacent base panels to tie them together.

4,009,666

APPARATUS FOR DISTRIBUTING FLUIDS BELOW SOIL SURFACES

Jack C. Russell, 2615 Ardsley Drive, Orlando, Fla. 32804, and John F. Russell, Blackhawk Drive, Indian Mound Village, Sanford, Fla. 32771

Filed May 19, 1975, Ser. No. 578,761
Int. Cl.² A01C *23/02*; B05B *1/20*
U.S. Cl. 111—6 **11 Claims**



1. Apparatus for injecting a fluid below a soil surface comprising:

an oblong hollow tube member;

a hollow support rod extending substantially normal to said tube member;

a plurality of nozzles carried by said support rod, each said nozzle capable of forming a stream of said fluid passing therethrough;

said tube member communicating with said rod and said rod communicating with all of said nozzles;

a plurality of spaced, individual skids of generally elliptical cross-section, each positioned adjacent one of said nozzles for providing a low friction contact with said soil surface and for engaging said soil surface to hold said nozzles out of contact with said soil surface, each skid having an aperture therethrough axial with the corresponding one of said nozzles;

means for pumping fluid through said nozzle under pressure; and wherein

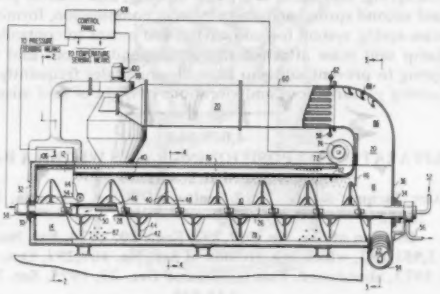
said pumping means and said nozzles cooperate to inject said fluid substantially below said soil surface.

4,009,667

INCINERATOR FOR COMBUSTIBLE REFUSE

Robert C. Tyer, 7254 Old Plank Road, Jacksonville, Fla. 32205, and Larry C. Bruce, 1800 Kingsley Ave., Orange Park, Fla. 32073

Filed May 5, 1975, Ser. No. 574,706
Int. Cl.² F23G *5/12*
U.S. Cl. 110—8 A **21 Claims**



1. An incinerator for burning combustible refuse which comprises:

a horizontally disposed stationary cylindrical combustion chamber means having an inlet end for receiving refuse and an outlet end for discharging exhaust gases and residue;

ignition means adjacent said inlet end for igniting the refuse;

screw conveyor means extending through the length of said chamber means for moving refuse therethrough;

air supply means for supplying combustion air under pressure;

stationary hot air manifold means, extending substantially the length of said chamber means in heat exchange relationship therewith, said manifold means having distributing means for admitting approximately equal volumes of air along the length of said chamber means; and

means for delivering said air under pressure from said air supply means to said manifold means adjacent the outlet end of said chamber means;

whereby the air is selectively pre-heated as it flows longitudinally through said manifold means counter to the flow of refuse through said chamber means, with the hottest air being admitted at the inlet end of said chamber means to quickly heat incoming refuse, and cooler, denser air containing more oxygen being admitted at the outlet end of said chamber means, to effect total combustion and prevent emission of smoke.

4,009,668

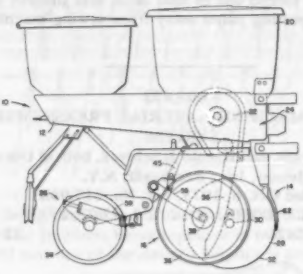
PLANTER APPARATUS AND METHOD FOR PLANTING

Ronald William Brass, Bettendorf, Iowa, and Harold Valentine Hansen, Cordova, Ill., assignors to Deere & Company, Moline, Ill.

Filed July 7, 1975, Ser. No. 593,798
Int. Cl.² A01C *5/06*
U.S. Cl. 111—85 **50 Claims**

1. An agricultural implement for planting seeds comprising: a frame having means thereon for securing said frame to a mobile power source; a furrow-forming unit depending from said frame and including a pair of opposed furrow-forming disks having means rotatably supporting said disks on intersecting axes so that the disks diverge upwardly and rearwardly from adjacent edges forward of their axes; gauge wheels carried on and supporting the frame for regulating furrow depth, said gauge wheels being rotatably supported on axes spaced

rearwardly of the disk axes and adapted to contact the ground in the area where the disks leave the ground so as to pack the ground on opposite sides of the furrow walls into strips of ground outwardly of and bordering the furrow, said gauge wheel cooperating with said disks to compact the furrow walls; a seed dispensing means including a seed hopper, a seed selecting mechanism, and a seed delivery tube carried by the frame, the tube having a discharge end near the furrow bottom; and a furrow closing means supported rearwardly of the seed delivery tube, said furrow closing means adapted to contact the ground surface outwardly of the furrow and exert thereon a measured force sufficient to collapse the furrow and provide a substantially uncompacted covering for said seeds.

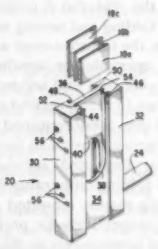


4,009,669

KNIFE BLOCK FOR TUFTING MACHINES

John H. Wear, Calhoun, Ga., assignor to The Singer Company, New York, N.Y.

Filed May 6, 1976, Ser. No. 683,862
Int. Cl.² D05C *15/24*
U.S. Cl. 112—79 R **10 Claims**



1. A knife block for a tufting machine comprising an elongated body member having a pair of longitudinally extending spaced flange portions, said flange portions being connected together by a pair of webs, said webs being laterally offset from and parallel to each other, said webs further being longitudinally offset from each other such that any plane extending substantially normal of the planes of said webs and to said flange portions intersects no more than one of said webs, means for slidably receiving at least one cutting knife between said flange portions laterally outwardly of each web, and means for slidably receiving at least one cutting knife between said flange portions laterally intermediate said webs.

8. The method of manufacturing a knife block having a pair of longitudinally extending spaced flange portions connected together by a pair of laterally spaced apart webs such that at least one pair of knife receiving grooves may be formed in said flange portions laterally intermediate said webs, said method comprising:

a. removing a portion of each web from a different longitudinal extremity to an inner edge of the web, the inner edges of said webs being longitudinally spaced one from the other,

b. cutting at least one pair of longitudinally extending grooves in the flange portions laterally intermediate said webs from one extremity of the block to a location within the longitudinal space between the webs adjacent the inner edge of a first web by cutting from the extremity from which the portion of the first web has been removed, and

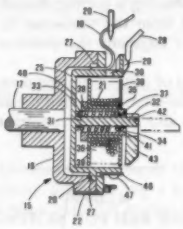
c. continuing to cut said at least one pair of longitudinally extending grooves by cutting from the other extremity of the block to adjacent the inner edge of the second web.

4,009,670

ROTARY HOOK SEWING MACHINE

Beatty Thomas Mitchell, 4800 Baja Court NE., Albuquerque, N. Mex. 87111

Filed Nov. 24, 1975, Ser. No. 634,776
Int. Cl.² D05B *57/14*
U.S. Cl. 112—231 **4 Claims**



1. A rotary hook, lock stitch, stationary bobbin case, sewing machine with the rotary hook mounted on and rotated by a horizontal shaft; the bobbin case, having a cylindrical sidewall and an inner closed end, rotatably mounted and retained inside the body of the rotary hook; the bobbin case being restrained from rotation with the rotary hook by means of a position finger slot in the sidewall thereof, having a bobbin thread guide shoulder adjacent to the position finger slot and having a center post affixed to the inside of the closed end thereof; a bobbin, having a center bore therein and two end flanges, operably mating with the bobbin case wherein the improvement comprises:

the bobbin case center post having a free end formed to provide a latch pivot support;

a bobbin ejector coil spring installed over the center post with one end against the closed end of the bobbin case;

a bobbin ejector bushing having a cylinderical body sized to rotatably fit the center bore of the bobbin, a smaller center bore sized to rotatably fit the center post of the bobbin case, a flange at one end to fit against one flange of the bobbin, and a larger bore at the flange end to accept the outer end of the ejector coil spring and form a shoulder at the junction with the smaller bore against which the ejector spring is compressed when the bobbin ejector bushing is operably inserted in the bobbin case;

a latch pivoted at the free end of the bobbin case center post;

the latch having a cross-section conforming to that of the cylindrical body of the bobbin ejector bushing so that when positioned in axial alignment with the bobbin case center post the bobbin may be inserted and removed over the latch, and larger than the smaller bore of the bobbin ejector bushing so that the latch will retain the bushing on the center post;

the pivot end of the latch being so shaped and proportioned, and the pivot so located, that when the latch is in axial alignment with the center post, in the unlatched or released position, the ejector spring forces the bobbin ejector bushing with the bobbin seated thereon outwardly

from the bobbin case so that the bobbin may be grasped and removed therefrom and so that, when the latch is placed in a position at right angles to the axis of the center post, in a latched position, the inner face of the latch bears against the outer end of the bobbin ejector bushing, causing the bobbin ejector bushing to remain operably inserted in the bobbin case; means for biasing the latch in position when latched and when unlatched;

the bobbin case having a thread guide slot in the sidewall thereof, providing a passageway for bobbin thread to pass to the outside of the bobbin case;

a curved leaf spring bobbin thread tensioner mounted externally on the sidewall of the bobbin case over the thread guide slot and secured thereto by a thread tension adjusting screw;

the thread tensioner having a locator prong inserted into a tensioner locator hole in the sidewall of the bobbin case and a thread guide finger bearing against the outer edge of the bobbin case sidewall constraining the bobbin thread between the tensioner and the circumferential surface of the sidewall of the bobbin case; and

the bobbin case having a bobbin thread groove guiding the bobbin thread from the tensioner to the bobbin thread guide shoulder adjacent the position finger slot of the bobbin case;

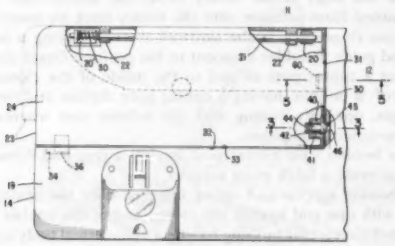
whereby removal of the bobbin requires only positioning of the latch to the unlatched position and manual grasping of the bobbin and does not require the removal of any other part.

4,009,671

CONVERTIBLE BED FOR SEWING MACHINES

Hilmar Wittler, Karlsruhe, and Adolf Martin, Reinstetten-Neu, both of Germany, assignors to The Singer Company, New York, N.Y.

Filed Mar. 30, 1976, Ser. No. 671,807
Int. Cl.² D05B *73/10*
U.S. Cl. 112—258 **3 Claims**



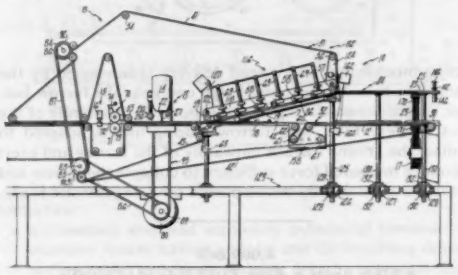
1. A sewing machine bed construction readily convertible to accommodate flat or tubular shaped work pieces for a sewing machine having a bed portion including a base, a stabilizing strut projecting from said base and defining therewith a plane of support for said sewing machine, and a cylinder bed formed with a work supporting surface, said cylinder bed extending in cantilever fashion from said base in spaced relation with said stabilizing strut, a retractable work supporting panel formed with a work supporting surface having one side adjacent to said sewing machine bed portion base and one side adjacent to said cylinder bed, means shiftably supporting the work supporting panel on said stabilizing strut for movement in a first direction toward and away from said cylinder bed into and out of a position in which the work supporting surface of said panel and said cylinder bed occupy contiguous and coplanar relation, and in a second direction toward and away from said sewing machine bed portion base, characterized in that a single latch detent is provided projecting from that side of said work supporting panel which is adjacent to said sewing machine bed portion base, and said sewing machine bed portion base is formed with a latch seat located so as both to accommodate said latch detent when the work supporting surface of said panel and said cylinder bed occupy contiguous and coplanar relation thereby holding said work supporting panel in position and to urge said latch detent in said second direction away from said sewing machine bed portion base when said latch detent is forced out of said latch seat thereby shifting said work supporting panel away from sewing machine bed portion base.

4,009,672

SEWING MACHINE MATERIAL PREASSEMBLY SYSTEM

John L. Rockerath, and Harold J. Schreck, both of Utica, N.Y., assignors to Jetsew, Inc., Barneveld, N.Y.

Filed Oct. 6, 1975, Ser. No. 619,968
Int. Cl.² D05B *1/00, 21/00, 35/02, 27/00*
U.S. Cl. 112—262 **32 Claims**



1. In a sewing machine system having material conveyance means for conveying material longitudinally forwardly through successive material folding and sewing stations for successively prefolding and sewing the material, and material folding and sewing apparatus at the folding and sewing stations for respectively prefolding the material and sewing the prefolded material as the material is conveyed longitudinally forwardly through the folding and sewing stations by the material conveyance means, the improvement wherein the material conveyance means is operable for simultaneously longitudinally forwardly conveying first and second separate material blanks individually along first and second convergent material paths respectively and into predetermined superimposed relationship at the convergence thereof to form individual preassemblies of individual first and second material blanks, wherein the material folding apparatus comprises first and second material folding means mounted along the first and second material paths respectively for prefolding the first and second material blanks respectively as they are longitudinally forwardly conveyed therealong respectively toward the convergence of the material paths for forming prefolded material preassemblies of the first and second prefolded material blanks, and wherein the material conveyance means is further operable for longitudinally forwardly conveying the prefolded material preassemblies individually from the convergence of the first and second material paths through the sewing station for being sewn by the material sewing apparatus.

4,009,673

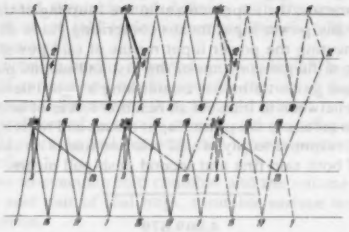
METHOD FOR MAKING A BUTTONHOLE ON A ZIGZAG STITCH SEWING MACHINE

Marcel Fresard, Petit-Lancy, Switzerland, assignor to Mefina S.A., Fribourg, Switzerland

Filed Dec. 30, 1975, Ser. No. 645,358
Claims priority, application Switzerland, July 15, 1975, 9222/75
Int. Cl.² D05B *3/06*
U.S. Cl. 112—264 **3 Claims**

1. In a method for making a buttonhole in a piece of material using a zigzag stitch sewing machine by forming the lips of

the buttonhole and then cutting the material between the lips, the step of forming the lips by the alternate stitching of opposite fractions of the desired length of the two lips, this stitching



always being carried out in the same directions, the stitching of opposite fractions being repeated in two adjacent zones of lips until two lips of the desired length are obtained.

4,009,674

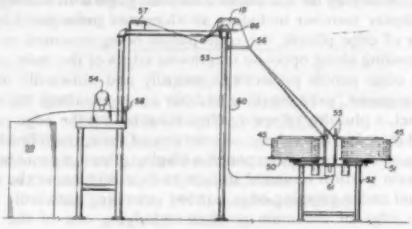
METHOD OF STACKING ROLLS

Charles Ray Ladd, Washington, N.C., assignor to Coats & Clark, Inc., Jamesville, N.C.

Filed June 25, 1975, Ser. No. 590,043

Int. Cl.² D05B *3/12*

U.S. Cl. 112—265 **7 Claims**



1. In a method for producing zippers of the type including the steps of producing tapes for the zippers on a knitting or weaving machine and feeding a pair of such tapes to a sewing machine for the production of zippers, the improvement comprising producing a pair of packages of tape each comprised of a roll of narrow tape, placing said packages with vertical axes on separate rotatable tables, directing tape from each of said rolls to said sewing machine, separately sensing the tension of each tape extending between a roll and said sewing machine, and positively rotating said tables to maintain the tension in the respective tape substantially constant.

4,009,675

FLOAT DEVICE WITH AT LEAST ONE FLOAT BODY

Nikolaus Waki Zöllner, Kaiserplatz 8, D-8 Munich 40, and Hanfried F. Schwark, Maria-Theresia-Strasse 6, D-8 Munich 80, both of Germany

Filed Nov. 14, 1974, Ser. No. 523,663

Claims priority, application Germany, Nov. 16, 1973, 2357398

Int. Cl.² B63B *5/24*

U.S. Cl. 114—267 **2 Claims**

1. A method for the production of a float device having at least two annular bodies coaxially held together by ropes, said bodies being produced simultaneously, said method comprising the steps of:

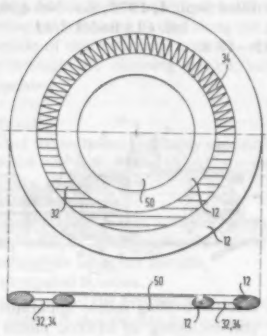
a. forming each annular body by,

1. placing a first foil surface piece on top of a second foil surface piece, said first and second surface pieces being larger than the overall surface of the annular body to be formed; and

2. connecting said first and second surface pieces along a predetermined interior periphery and outer periphery to produce an annular tube having a chamber of predetermined internal dimensions, the portions of the surface pieces disposed beyond the tube so formed defining projection portions which connect the tube to an adjacent tube being simultaneously formed;

b. inflating said chamber;

c. partially filling said chamber along the inner periphery of the tube with an annular layer of a closed pore plastic foam having a high density;



d. then filling the remaining area of the chamber with a closed pore plastic foam having a low density and extended with foreign material having similar mechanical properties;

e. separating the annular bodies initially connected with each other by the projecting portions of the surface pieces; and

f. tying the annular bodies together by means of ropes so that relative peripheral movement between the annular bodies is prevented.

4,009,676

MOUNTING ARRANGEMENT FOR PROTECTING SHIPBOARD NUCLEAR REACTORS AGAINST COLLISION DAMAGE

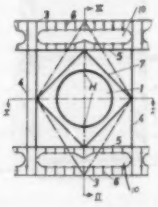
Herbert Kura, Bremen, Germany, assignor to Aktiengesellschaft "Weser", Bremen, Germany

Filed Mar. 14, 1975, Ser. No. 558,718

Claims priority, application Germany, Mar. 27, 1974, 2414714

Int. Cl.² B63B *3/56*, *25/24*

U.S. Cl. 114—78 **12 Claims**



1. A mounting arrangement for protecting shipboard equipment from collision forces, comprising a ship having bulkheads which bound an interior space in which equipment to be protected is stored; and a discrete polygonally-shaped shield separate from said bulkheads and being mounted to said ship in said space so as to farm within said space a call which surrounds the equipment to be protected, said shield comprising a plurality of wall portions each having respective opposite ends fixedly anchored to said ship, said wall portions being

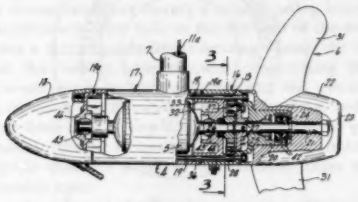
arranged in two opposite pairs each including two wall portions inclined relative to each other so as to include with one another an angle whose bisectrix is normal to a line which extends along the length of said ship.

4,009,677

RADIAL THRUST APPARATUS FOR HIGH THRUST TROLLING MOTOR

Elmer E. Croisant, Oshkosh, Wis., assignor to Brunswick Corporation, Skokie, Ill.

Filed Sept. 4, 1975, Ser. No. 610,303
Int. Cl.² B63H *5/13*
U.S. Cl. 115—18 E **7 Claims**



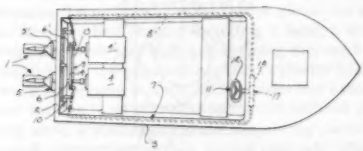
1. In an electric trolling motor apparatus having a lower cylindrical unit including an electric motor having a motor shaft and a drive propeller, an improvement in the coupling of the motor shaft to the propeller, comprising an output gear reduction means for connecting the electric motor shaft to the propeller and having input gear means for providing a rotating input to the gear reduction means and an output drive gear means providing a rotating output of a substantially lesser rate than said rotating input, said motor shaft being connected to said input gear means, said propeller having a propeller shaft secured to said output drive gear means, a gear housing having a bearing recess, a radial bearing means secured within said bearing recess for rotatably supporting said propeller shaft, said radial bearing permitting rotational movement of the bearing and including an outer spherical seat located in said recess and establishing coaxial alignment of the motor and propeller shafts and output drive gear means relative to the input gear means of said gear reduction means.

4,009,678

MULTIPLE PUSH-PULL CABLE TRANSMISSION APPARATUS

Irving William North, Oshkosh, Wis., assignor to Brunswick Corporation, Skokie, Ill.

Filed Apr. 23, 1975, Ser. No. 570,716
Int. Cl.² B63H *5/12*
U.S. Cl. 115—18 R **19 Claims**



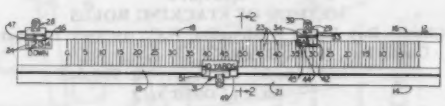
1. In a powered mechanical motion transmission apparatus having oppositely movable input means for controlling a remote positioning element means through a first and a second push-pull means, each of said push-pull means including an outer guide means and an inner movable core means and having the guide means fixedly mounted at the first end and having means connecting the first end of the core means of the first and second push-pull means to the movable input means for opposite movement of the core means in response to a given movement of the movable input means, means connecting the opposite end of the core means to said remote positioning element means, a power means having a power input means, each of said core means establishing reaction forces on the corresponding guide means as a result of the movement of the core means, the improvement in the coupling of the guide means to the power input means comprising guide tie means interconnecting the power input means of said power means and each of the guide means of the first and second push-pull means, said guide tie means establishing a rigid interconnection therebetween to transmit all reaction forces of both of the said guide means to the power input means and thereby establish rapid response to any of said reaction forces on said guide means of both said first and second push-pull means.

4,009,679

DISPLAY FOR A SIMULATED FOOTBALL GAME

John G. Kircher, 1010 Kinmont Ave., Cincinnati, Ohio 45208

Filed Oct. 9, 1975, Ser. No. 621,161
Int. Cl.² A63B *71/06*
U.S. Cl. 116—120 **3 Claims**



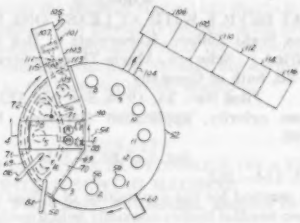
1. A display for a simulated football game which comprises a display member including an elongated main panel and a pair of edge panels, the edge panels being mounted on and extending along opposite lengthwise edges of the main panel, the edge panels projecting upwardly and outwardly of the main panel, yard marking indicia arranged along the main panel, a plurality of spring clips mounted on the edge panels and movable therealong, at least one of the spring clips being mounted on each edge panel, a display gripping panel having a main portion mounted in face-to-face relation to the main panel and a gripping edge portion extending outwardly from one edge of the main portion underlying one of the edge panels, and an indicator member mounted on each of the spring clips and alignable with selected yard marking indicia.

4,009,680

APPARATUS FOR PRODUCING HIGH WEAR-RESISTANT COMPOSITE SEAL

Werner H. Fengler, 23651 Fordson Drive, Dearborn, Mich. 48124

Division of Ser. No. 506,332, Sept. 16, 1974, Pat. No. 3,991,229. This application Aug. 13, 1975, Ser. No. 604,478
Int. Cl.² C23C *13/12*
U.S. Cl. 118—49.1 **4 Claims**



1. A continuous-production apparatus for applying a wear-resistant coating to successive groups of machine element workpieces, said apparatus comprising

a horizontally disposed rotatable turntable having a planar top surface and a plurality of workpiece holders disposed in an annular path thereon concentric with the axis of

rotation thereof in circumferentially spaced relationship relatively to one another, each of said holders being disposed within a separate recess in said top surfaces,

an air-tight housing disposed adjacent a portion of said path on said turntable and defining with the corresponding portion of said table a chamber therein adapted to be evacuated,

said housing having a bottom portion which is parallel to said surface and has an opening therein of larger cross-sectional dimensions than any said recess,

a pair of spaced, generally annular seal rings disposed about said opening and between said bottom portion and said surface,

means to evacuate said chamber and the volume bounded by said pair of seal rings, turntable surface and bottom portion,

treating means communicating with said volume,

a loading station and an unloading station communicating with said turntable.

means within said chamber for holding an evaporable wear-resistant alloy,

means in said chamber for evaporating said alloy,

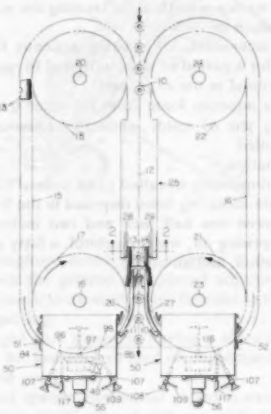
automated means for indexing said rotatable turn-table whereby each group of workpieces is successively received within a said recess at the loading station, carried beneath said housing into a first portion of the evacuated volume, out of said volume and within said opening to receive a vapor deposition of said alloy, into a second portion of said evacuated volume whereby to be exposed to said treating means, and finally out of said volume to the unloading station.

4,009,681

DEVICE FOR AUTOMATICALLY CLEANING MASKS IN POWDER COATING SYSTEM

Russell William Heckman, Perrysburg; George Allen Nickey, Toledo, and John Edward Poole, Holland, all of Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed Apr. 16, 1976, Ser. No. 677,596
Int. Cl.² B05C *11/14*
U.S. Cl. 118—70 **16 Claims**



1. In combination:

a means for masking a portion of articles which are traveling in a substantially linear path through an article treatment zone comprising

a plurality of masks each comprising a pair of complementary shields for masking one portion of the article from exposure to the treatment zone,

a carriage for one of the shields of said pair thereof operable in a path on one side of the travel of the articles, and

a carriage for the other of the shields of said pair thereof operable in a path on the opposite side of the travel of the articles,

the carriages being operated in unison through their paths of movement for bringing the shields of each pair together and moving them with the traveling articles and surrounding an article in a juxtaposed position prior to entry of the treatment zone and maintaining them in said position through said zone, thereafter separating said shields and carrying them back to the beginning of the treatment zone, and

a shield cleaning device individual to each carriage,

means supporting said cleaning device along the path of said carriage outside of the treatment zone for movement of the shields through the cleaning device, said cleaning device comprising

a frame,

a first rotary brush,

means connected to the frame rotatably supporting the first rotary brush on one side of the shields for engaging the adjacent surface thereof,

a second rotary brush,

means connected to the frame rotatably supporting the second rotary brush on the opposite side of the shields for engaging the surface adjacent thereto,

a plurality of elongated brushes,

means supporting each of the brushes on the frame disposed at opposite sides of the shields for engagement of the brushes along opposite surfaces of each of the shields during movement through the cleaning device, and

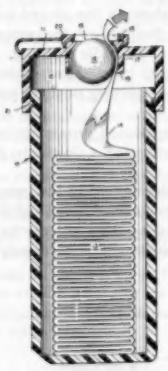
motor operated drive means connected to operate said first and second rotary brushes.

4,009,682

WEB DISPENSER

Savinay Patel, Roselle, and Bernard F. Szuhaj, Lombard, both of Ill., assignors to Central Soya Company, Inc., Fort Wayne, Ind.

Filed Apr. 19, 1976, Ser. No. 678,157
Int. Cl.² B05C *11/02*
U.S. Cl. 118—118 **4 Claims**



1. A towelette dispenser comprising a container having an open mouth, an elongated web of material in said container, a dispensing closure for said container, said closure including an apertured member closing said open mouth, a ball mounted in said aperture and rotatable therein to pass said web around said ball upon manual pulling of said web, said web being equipped with transversely extending lines of potential severance, said web having a tensile strength so related to the mounting of said ball in said aperture to permit pulling said

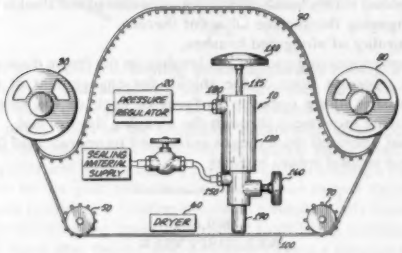
web through the clearance between said ball and aperture without severing said web while a line of potential severance is in said clearance, said closure aperture being defined by a wall providing upper and lower spaced apart inwardly extending ball retaining flanges, said upper flange being sized to prevent passage of such ball upon application of said manual pulling, said container including a liquid material therein disposed to coat or impregnate said web, and said ball in conjunction with said aperture defining means metering the liquid being carried by said web passing therebetween.

4,009,683

APERTURE SEALING DEVICE FOR FILM LEAD FABRICATION

Frederick D. Olney, Jr., and Dennis E. Rich, both of Phoenix, Ariz., assignors to Honeywell Information Systems, Inc., Phoenix, Ariz.

Filed Dec. 12, 1975, Ser. No. 640,128
Int. Cl.² B05C *1/06*
U.S. Cl. 118—266 **3 Claims**



1. An improved apparatus for sealing apertures in an insulating strip, said apparatus comprising:

a. a hollow cylindrical body closed at one end and opened at the other end;

b. a plunger mounted so as to move within the hollow cylinder, the diameter of the plunger equal to the inside diameter of the cylinder;

c. a rod extending through the closed end of the cylinder and connected to the plunger, the opposite end of the rod being connected to a handle member;

d. pressure input means located proximate to the closed end of the cylinder for applying positive pressure to one side of the plunger;

e. fluid input means located proximate to the open end of the cylinder for inserting a fluid into the cylinder body; and

f. discharge means connected to the open end of the cylinder for directing and controlling fluid flow from the cylinder onto an insulating strip, the discharge means further comprising an outlet orifice terminated with a sintered metal element.

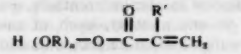
4,009,684

WATER SOLUBLE POLYMERS USEFUL IN THE PREPARATION OF NOVEL ANIMAL LITTER

Karel Kliment, Princeton; Rudolf N. Vermes, Randolph, and Richard F. Stockel, Somerville, all of N.J., assignors to National Patent Development Corporation, New York, N.Y.

Filed Nov. 26, 1975, Ser. No. 635,522
Int. Cl.² A01K *29/00*
U.S. Cl. 119—1 **20 Claims**

1. An animal litter comprising (1) a porous, inert solid substrate treated with (2) a solid water soluble copolymer of (a) 5–35% of a hydroxyester of a 2-alkenoate of the formula



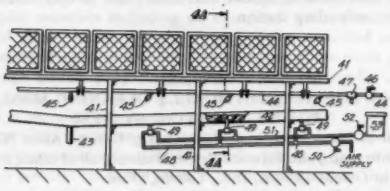
wherein R is alkylene of 2 to 4 carbon atoms, R′ is hydrogen or alkyl of 1 to 4 carbon atoms and n is an integer with (b) 95 to 65% of a copolymerizable water soluble monomer or polymer, said copolymer being impregnated with (3) a fragrance or deodorizer.

4,009,685

METHOD AND APPARATUS FOR HANDLING WASTES FROM SMALL ANIMAL CAGES

Nickolas J. Sojka, Charlottesville, Va., assignor to The University of Virginia, Charlottesville, Va.

Filed June 16, 1975, Ser. No. 587,306
Int. Cl.² A01K *1/01*
U.S. Cl. 119—22 **6 Claims**



1. In an animal cage in which a litter tray is provided to receive animal wastes, a method for treating the wastes, which comprises the steps of

disposing a semi-solid, long-lasting aqueous foam in the litter tray for a period of time sufficient to receive wastes from an animal in the cage, and

removing the aqueous foam from the litter tray by means comprising jets of water when the aqueous foam has become soiled.

6. In combination,

a litter tray removably installed in an animal cage, and

aqueous waste-receiving foam disposed in the litter tray in a layer between one half inch and two inches deep, the foam comprising air, water, sorbitol, a fatty acid, a polyhydric alcohol, and an amine.

4,009,686

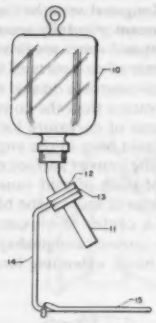
BIRD PERCH

John E. Gilchrist, 1189 Singletary Ave., San Jose, Calif. 95126

Filed Sept. 2, 1975, Ser. No. 609,840
Int. Cl.² A01K *31/12*
U.S. Cl. 119—26 **2 Claims**

1. A bird perch in combination with an inverted feeder having a depending feed tube; said bird perch consisting of a resilient collar and a configuration of material defining a perch member and a support member, said support member

having means connecting said resilient collar at one end and said perch at the other end, said resilient collar slidably received on said feed tube to permit movement of said perch member with respect to said feeder.



4,009,687

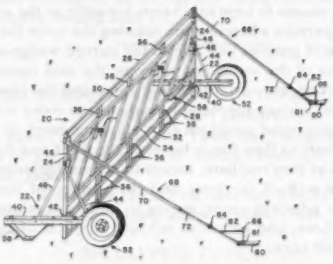
ROUGHAGE FEEDER UNIT

John G. Korthals, R.R. 1, George, Iowa 51237

Filed Sept. 8, 1975, Ser. No. 610,932

Int. Cl.² A01K *5/00*

U.S. Cl. 119—51 R **14 Claims**



9. A roughage feeder unit adapted to be manually transported over the ground and placed adjacent to roughage to allow livestock to move the unit forward to feed on the roughage, comprising:

an upright gate assembly having a plurality of feeding stations for livestock to feed on roughage located forwardly of said gate;

a pair of spaced horizontal supports extending forwardly and rearwardly of said gate assembly for supporting said gate assembly in an upright position;

a ground engaging wheel mounted on each support forwardly of said gate assembly to permit said gate assembly to move forward over the ground in response to pressure by livestock against said gate assembly; and

a ground engaging skid mounted on each support rearwardly of said gate assembly and adapted to slide over the ground in response to pressure by livestock against said gate assembly to allow the livestock to feed on the roughage.

4,009,688

ROTARY PISTON TYPE ENGINE

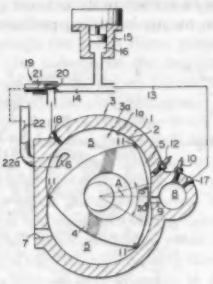
Motoyuki Hayashida; Mutsuo Wakamoto; Akinori Tamura, and Masafumi Ikegami, all of Hiroshima, Japan, assignors to Toyo Kogyo Co., Ltd., Japan

Filed Mar. 3, 1975, Ser. No. 554,929

Claims priority, application Japan, Mar. 4, 1974, 49-25998; May 4, 1974, 49-50057

Int. Cl.² F02B *53/10*

U.S. Cl. 123—8.09 **7 Claims**



1. Rotary piston type internal combustion engine comprising a casing having a cavity of multilobed trochoidal configuration defined by an inner peripheral wall and having a major and a minor axis, a substantially polygonal rotor disposed in said cavity of the casing with apex portions in sliding contact with said inner peripheral wall of the casing to define a plurality of working chambers which are variable in volume as the rotor rotates to effect intake, compression, expansion and exhaust strokes of the engine, intake port means provided in the casing for communication with the working chamber in intake stroke, intake passage means communicating with said intake port means, throttle valve means disposed in said intake passage means, exhaust port means provided in the casing for communication with the working chamber in exhaust stroke, main combustion chamber means provided outside the cavity in the casing and having a volume of 35 to 65% of the sum of the volume of the main combustion chamber means and that of the working chamber at top dead center, communication passage means comprising a single duct connecting the main combustion chamber means with the working chamber and opening to the working chamber at a position between 15° before and 30° after the minor axis of the trochoid of the cavity, main fuel supply means including main fuel injection nozzle means for supplying fuel to the main combustion chamber means, auxiliary fuel supply means for supplying fuel to the working chamber on the intake stroke, and control means for allowing the auxiliary fuel supply means to supply fuel to the working chamber during high load operation of the engine only and decreasing the amount of fuel supplied by the main fuel supply means to the main combustion chamber in relation to the increase in the amount of fuel supplied by the auxiliary fuel supply means to the working chamber during high load operation of the engine whereby the air-fuel ratio of mixture formed in the main combustion chamber can always be maintained between 10 to 16.

4,009,689

ROTARY COMBUSTION ENGINE EXHAUST GAS RECIRCULATION SYSTEM

Leslie K. Walters, Rochester, Mich., assignor to General Motors Corporation, Detroit, Mich.

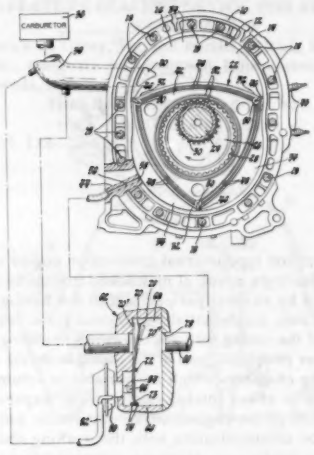
Filed May 2, 1975, Ser. No. 573,909

Int. Cl.² F02B *53/10*

U.S. Cl. 123—8.13 **3 Claims**

1. A rotary combustion engine comprising housing means having an internal peripheral wall and oppositely facing side walls, a rotor rotatably mounted in said housing means with

sides facing said side walls and apexes that remain adjacent said peripheral wall as said rotor rotates, said rotor and said walls cooperatively providing a plurality of chambers that are spaced about and move with said rotor while varying in volume, said housing means having an intake port openable by said rotor to said chambers for delivering a combustible gaseous mixture to said chambers as they expand in an intake phase, ignition means for igniting the mixture is said chambers following a compression phase whereupon they expand in an expansion phase, said housing means having an exhaust port openable by said rotor to said chambers for exhausting said chambers as they contract in an exhaust phase, and exhaust gas recirculation means including pressure responsive valve



means responsive to both exhaust gas pressure and intake vacuum for sequentially connecting said chambers adjacent their trailing end to said intake port only below a predetermined exhaust gas pressure that occurs when said chambers are nearing the end of their exhaust phase and only then through a variable size opening that increases in size with decreasing intake vacuum whereby the differential between the pressure of the exhaust gases and the intake mixture then causes exhaust gases rich in unburned hydrocarbons in the trailing region of each chamber to flow to said intake port and thereafter be recirculated through the intake, compression and expansion phases and whereby the recirculated exhaust gas flow increases with decreasing intake vacuum.

4,009,690

ROTARY INTERNAL COMBUSTION ENGINE

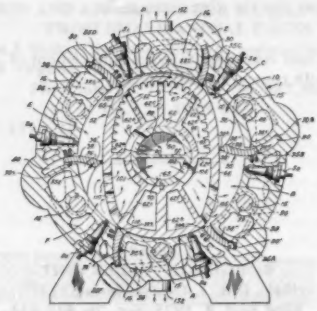
George W. Moran, 10532 Berry Knoll, Dallas, Tex. 75230

Continuation-in-part of Ser. No. 365,413, May 31, 1973, Pat. No. 3,894,519. This application July 14, 1975, Ser. No. 595,578

Int. Cl.[2] F02B *53/00*

U.S. Cl. 123—8.45 **4 Claims**

1. An internal combustion engine comprising: an engine block having a circular bore extending therethrough; end plates adjacent opposite ends of said engine block, each of said end plates having openings extending therethrough; a shaft; means rotatably securing said shaft in the bore of the engine block such that said shaft extends through said openings in said end plates; a rotor secured to said shaft, said rotor having a substantially oval shaped cross-section and having first and second arcuate end surfaces, said first arcuate end surface having a radius of curvature substantially equal to the radius of said bore such that said arcuate end surface is substantially parallel to the wall of said bore, said rotor having a second arcuate end surface substantially parallel to the wall of the bore but spaced from the wall of the bore a distance greater than the distance the first arcuate end surface is spaced from the wall of the bore; sealing vanes, each of said sealing vanes having a concave surface and a convex surface arranged to form an elongated vane having a curved wedge-shaped cross-section means pivotally securing said vanes to said end plates such that said vanes are pivotable about an axis coinciding with the center of curvature of said convex surface on said vane; said concave surface on said sealing vane having a shorter radius of curvature than the convex surface on said sealing vane and a center of curvature located a greater distance from the wall of said bore in the engine block than the center of curvature of the convex surface of the vane; an arm secured to each end of each of said vanes; means pivotally securing each of said arms to said engine block such that each vane is pivotal about a center of curvature of said convex surface of said vanes; curved wedge-shaped vane receiving grooves in the engine block extending longitudinally thereof



and positioned to allow oscillation of said vanes in said grooves said grooves being milled to provide a thin open space between the concave surface of each vane and the inner wall of each groove when the vanes are in the outermost position in the grooves; means to urge said vanes inwardly as the contour of the rotor permits wherein upon rotating the rotor the vanes oscillate in said grooves and due to the curved wedge-shaped cross sections of the vanes and grooves, the said open space between the concave surface on said vanes and the inner wall of the grooves widens appreciably as the vanes move inwardly from their outermost positions thus allowing gases in operational chambers to flow freely between the front and the back of the vanes as they oscillate; means to deliver fuel into space between the wall of the bore and the surface of the rotor intermediate adjacent vanes; means to initiate combustion of fuel in said bore; and means to exhaust products of combustion from said bore.

4,009,691

PORT CONTROL ARRANGEMENT IN A ROTARY-PISTON INTERNAL-COMBUSTION ENGINE

Huschang Sabet, Eduard-Pfeiffer-Str. 67, Stuttgart, Germany (D-7000)

Filed Dec. 8, 1975, Ser. No. 638,341

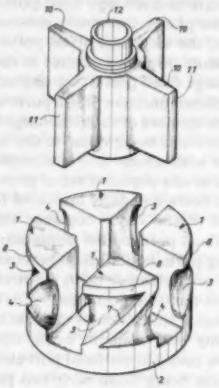
Claims priority, application Germany, Jan. 10, 1975, 2500755

Int. Cl.[2] F02B *55/14*; **F01C** *1/00*; **F04C** *17/00*

U.S. Cl. 123—8.47 **10 Claims**

1. In a rotary-piston, internal-combustion engine having a casing of circular cross section at right angles to an axis of said casing, two sets of pistons mounted in the casing for angular movement relative to each other between two terminal positions and for rotation about said axis, each piston having two radially extending faces, said faces circumferentially defining chambers in said casing between respective pistons of said sets, respective circumferential faces of said pistons sealingly engaging said casing, the circumferential faces of the pistons

in one of said sets having an angular width relative to said axis substantially greater than the angular width of the circumferential faces of the pistons in the other set, each piston in said one set being formed with two recesses in the circumferential face thereof, said recesses being open in respective opposite circumferential directions toward respective chambers and in a radially outward direction toward said casing, said casing being formed with a pair of ports, the improvement which comprises:



a. said two recesses defining therebetween an elongated land of the circumferential face of each piston in said one set;

b. the circumferential faces of the pistons in said other set being elongated;

c. the direction of elongation of each of said lands and the direction of elongation of each of said circumferential faces of the pistons of said other set having each an axial component;

d. said directions of elongation being differently inclined relative to said axis.

4,009,692

TORCH-IGNITION RECIPROCATING INTERNAL COMBUSTION ENGINE

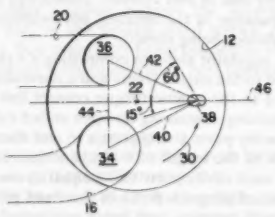
Yasuo Sakai, Yokohama, and Yasuhiko Nakagawa, Fujisawa, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Nov. 15, 1974, Ser. No. 524,319

Claims priority, application Japan, Nov. 20, 1973, 48-130382

Int. Cl.² F02B *19/10, 19/16*

U.S. Cl. 123—32 SP **1 Claim**



1. An internal combustion engine comprising: a cylinder head; a cylinder closed off by the cylinder head; a piston movable within the cylinder between the top dead center and the bottom dead center; a main combustion chamber formed in the cylinder between the piston and the cylinder head; an auxiliary combustion chamber; a torch flame passageway establishing communication between the main and auxiliary combustion chambers; means for introducing a relatively lean mixture into said main combustion chamber, the relatively lean mixture introducing means being so constructed and arranged as to impart rotation to inflowing relatively lean mixture as it enters the main combustion chamber to cause the rotation flow of lean mixture about the cylinder axis; means for initiating combustion in the auxiliary combustion chamber; the volume of the auxiliary combustion chamber being from 6 percent to 15 percent of the total clearance volume that is the combined volume including a volume of the auxiliary combustion chamber, a volume of the main combustion chamber at the top dead center position of the piston and a volume of the torch flame passageway; a ratio of cross sectional area cut through the torch flame passageway at right angles thereto to the volume of the auxiliary combustion chamber being from 0.07cm²/cc to 0.3cm²/cc; a length to diameter ratio of the torch flame passageway being from 0.5 to 3.0; and the torch flame passageway being arranged in an axial plane which is parallel to the cylinder axis and includes the inlet end of the torch flame passageway and which is displaced from an axial plane including the cylinder axis and the inlet end of the torch flame passageway by an angle not greater than 60°, as measured from the second mentioned axial plane to the first mentioned axial plane in the direction of the rotating flow of lean mixture passing through the second mentioned plane within an area adjacent to the inlet end of said torch flame passageway and 15°, as measured from the second mentioned axial plane to the first mentioned axial plane in a direction opposite the direction of the rotating flow of lean mixture passing through the second mentioned plane within an area adjacent to the inlet end of the torch flame passageway and as measured with the inlet of the torch flame passageway as the center of measurement.

4,009,693

AIR PURGING AND COOLING SYSTEM FOR INTERNAL COMBUSTION ENGINES

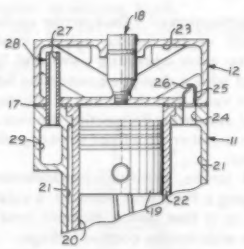
John M. Bailey, Dunlap; John J. Cychul, Jr., and Michael K. Stratton, both of Peoria, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed May 19, 1972, Ser. No. 254,851

The portion of the term of this patent subsequent to June 1, 1992, has been disclaimed.

Int. Cl.² F02F *1/36*

U.S. Cl. 123—41.82 A **11 Claims**



1. An engine comprising:

a block having at least one cylinder formed therein and defining a pair of upstanding walls, a head attached to said block to cover said cylinder, said head being substantially rectangular in cross-section with the longer dimension thereof being of the same substantial length as said block and the shorter dimension thereof being aligned and forming an extension of said upstanding walls, first chamber means formed in said block closely adjacent to said cylinder, said first chamber means circumventing said cylinder substantially long the full axial length thereof, and a piston reciprocally mounted in said cylinder and fuel injection means mounted in said head,

said head further forming a second chamber means,

said chamber means being substantially unobstructed whereby the fuel injection means is substantially totally exposed to a coolant passing therethrough,

first passage means communicating said first and second chamber means,

third chamber means formed in said block vertically below said second chamber means for receiving coolant from said first chamber means by way of said second chamber means, and

combined air purging and second passage means directly communicating said second chamber means with said third chamber means and having an inlet positioned upwardly in said second chamber means for delaying direct communication of coolant, in an at least generally vertically downwardly direction, from said second chamber means to said third chamber means until said second chamber means has been at least substantially filled with coolant.

4,009,694

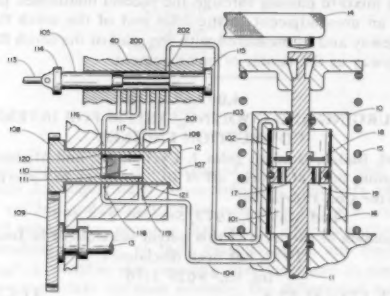
GASOLINE ENGINE TORQUE REGULATOR WITH PARTIAL SPEED CORRECTION

Joseph Carl Firey, P. O. Box 254, Northgate Station, Seattle, Wash. 98125

Filed Apr. 15, 1976, Ser. No. 677,404

Int. Cl.[2] F01L 9/02

U.S. Cl. 123—90.12 **4 Claims**



3. The combination of a four stroke cycle gasoline engine, complete with engine intake valves, intake valve closing springs, intake valve operating cams and linkage, and additionally fitted with a dashpot connecting between each such engine intake valve and the frame of the engine, wherein the improvement comprises connecting the two chambers of each such dashpot together via a fixed stroke, positive displacement flow regulator;

said fixed stroke, positive displacement, flow regulator comprising a fixed port element, a rotating port element and drive, a free piston element, and a port regulator element with torque control linkage;

said fixed port element being secured to the engine frame and containing a cavity, within which the rotating port element rotates, and having two groups of fixed ports; one group of fixed ports; the pressure fixed ports, being connected individually to the port regulator element whose other connection is via a portion of the control passage to one chamber of the dashpot, these pressure fixed ports connecting into the cavity in two sets of pressure fixed ports, each such set being coplanar in a plane at right angles to the axis of rotation of the rotating port element, the plane containing the one set of pressure fixed ports being displaced axially along said axis of rotation from the plane containing the other set of pressure fixed ports by a distance sufficient for sealing therebetween, the pressure fixed ports of each such set being angularly displaced relative to each other about said axis of rotation, the number of such pressure fixed ports in each set of the two sets being an integral odd number; the other group of fixed ports, the discharge fixed ports, being connected together and jointly connecting via the other portion of the control passage to the opposite chamber of the dashpot these discharge fixed ports connecting into the cavity in two sets of discharge fixed ports, each such set being coplanar in a plane at right angles to the axis of rotation of the rotating port element, these two planes containing these two sets of discharge fixed ports being coincident with the two planes containing the two sets of pressure fixed ports, the discharge fixed ports of each such set being angularly displaced relative to each other and each such discharge fixed port being displaced 180° from one of the coplanar pressure fixed ports about said axis of rotation, the number of such discharge fixed ports in each set of the two sets being equal to the number of pressure fixed ports with which they are coplanar, the pressure fixed ports of one coplanar set of pressure and discharge fixed ports being angularly displaced from the discharge fixed ports of the other coplanar set of pressure and discharge fixed ports by the displacement angle between the rotating ports as described hereinafter;

said rotating port element being positively rotated, within the cavity in the fixed port element, as by gears or chains, from an engine shaft such as the crankshaft or camshaft, said rotating port element being closely and sealably fitted to the cavity in the fixed port element; said rotating port element being fitted with two passages, each such passage being fitted with two ports at its ends, one such port of one such passage indexing with and being always coplanar with one set of coplanar pressure and discharge fixed ports in the fixed port element the other port of this same passage connecting always to one end of the free piston element as described hereinafter, one such port of the other passage indexing with and being always coplanar with the other set of coplanar pressure and discharge fixed ports in the fixed port element the other port of this latter passage connecting always to the other end of the free piston element, said two rotating ports which index with and are coplanar with the pressure and discharge fixed ports being angularly displaced from one another about the axis of rotation of the rotating port element by the displacement angle which can have any value between zero and 180°; said rotating port element being axially held in alignment within the cavity in the fixed port element so that the rotating ports index with and remain coplanar with the sets of pressure fixed ports and discharge fixed ports;

said free piston element being a free piston and closed ended cylinder with the free piston fitted closely and moveably within the cylinder and being free to move within said cylinder, one end of said cylinder connecting always into one passage in the rotating port element and the other end of said cylinder connecting always into the other passage in the rotating port element; the ends of said cylinder being closed;

said port regulator element comprising a fixed port housing secured to the engine frame and a moveable regulator bar secured to the engine torque control linkage; said fixed port housing containing an open ended cylindrical cavity with cavity ports giving access to and distributed along a portion of the length of said cylindrical cavity, the number of such cavity ports being equal to one more than the number of pressure ports in the fixed port element and each such pressure port being connected individually to one such cavity port, the one extra cavity port not connected to a pressure port being connected via a portion of the control passage to one chamber of the dashpot and being coplanar with that one cavity port which does connect to a pressure port and is never closed by the moveable regulator bar in a plane at right angles to the centerline axis of the cylindrical cavity in the fixed port housing; said moveable regulator bar fitting closely, seal-

ably and axially moveably within the cylindrical cavity in the fixed port housing and having two axial motion stops and a tapered recessed portion of its length between seals, the length of said tapered recessed portion being somewhat longer than the length of that portion of the cylindrical cavity containing the cavity ports, one of the axial motion stops being positioned on the moveable regulator bar so that when the bar is pushed against this stop the tapered recessed portion aligns with that portion of the cylindrical cavity containing the cavity ports and all cavity ports are open, the other axial motion stop being positioned on the moveable regulator bar so that when the bar is pushed against this stop the tapered recessed portion aligns and opens only with that pair of cavity ports which are coplanar and includes the one extra cavity port not connected to a pressure port, said moveable regulator bar being axially moveable to any position between the two positions set by the two axial motion stops via a torque control linkage connected to said moveable regulator bar, such axial motion closing off or opening up cavity ports to the tapered recessed portion of the moveable regulator bar;

the displacement volume of one full stroke of the dashpot, *VD*, the displacement volume of one full stroke of the free piston, *VP*, the total number of pressure fixed ports in the fixed port element, *n*, the revolutions per minute of the rotating port element, *NR*, the revolutions per minute of the engine, *NE*, are necessarily related to one another and to the minimum intake valve closing angle, *AM*, in crankshaft radians, according to the following equations;

$$(VP)(n)(NR)(AM) = (6.283)(VD)(NE)$$

$$(VP)(n)(NR/NE)(AM) = (6.283)(VD)$$

wherein the speed ratio, NR/NE, is determined by the positive drive mechanism driving the rotating port element from the engine shaft; and related to the maximum intake valve closing angle, *AX*, in crankshaft radians, according to the following equations;

$$(VP)(NR/NE)(AX) = 6.283\ VD$$

$$(VP)n(NR/NE)(AM) = 6.283\ VD$$

$$(AX)(AX) = n(AM)$$

wherein the minimum intake valve closing angle, *AM*, is at least as samll as the intake valve closing angle in crankshaft radians of the intake cam on the engine camshaft, *AC*, and is preferably less than *AC* up to as small as one half of *AC*; wherein the maximum intake valve closing angle, *AX*, is equal to the minimum intake valve closing angle, *AM*, plus 3 radians minus the maximum engine ignition spark advance in crankshaft radians before piston top dead center;

on multicylinder gasoline engines the several moveable regulator bars of the several fixed stroke, positive displacement, flow regulators being connected to the torque control linkage with equal cavity port opening.

4,009,695

PROGRAMMED VALVE SYSTEM FOR INTERNAL COMBUSTION ENGINE

Louis A. Ule, 27 Mustang Road, Rolling Hills Estates, Calif. 90274

Continuation of Ser. No. 306,399, Nov. 14, 1972, abandoned, which is a continuation of Ser. No. 125,250, March 18, 1971, abandoned. This application Nov. 18, 1974, Ser. No. 524,406

Int. Cl.[2] F01L *9/02*

U.S. Cl. 123—90.13 **9 Claims**

1. An installation for controlling an internal combustion engine comprising:

at least one cylinder and piston combination;

a crank shaft with said piston connected thereto by a connective rod, so that said crank shaft revolves about an axis;

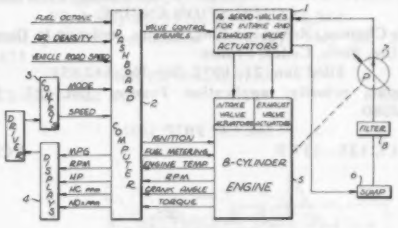
an inlet valve and an outlet valve for each cylinder;

a fuel supply means;

a first means for providing a first signal indicative of the desired output power of said engine;

second means for detecting the phase angle of said crank shaft and for producing a second signal each time said crank shaft passes a given phase angle;

third means responsive to said first signal from said first means and also to said second signal from said second



means for providing, at a predetermined time and of a predetermined time duration, a third signal for a respective one of said inlet valves;

fourth means responsive to the second signal from said second means for providing, at a predetermined time, a fourth signal for a respective one of said outlet valves;

fifth means, in combination with a respective inlet valve and responsive to a respective third signal, for opening said respective inlet valve and keeping said inlet valve open for said predetermined time duration;

sixth means in combination with a respective outlet valve and responsive to a respective fourth signal for opening said respective outlet valve.

4,009,696

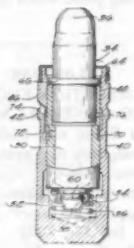
HYDRAULIC LASH ADJUSTER WITH INTERNAL OIL PRESSURE CONTROL

Richard D. Cornell, Muskegon, Mich., assignor to Sealed Power Corporation, Muskegon, Mich.

Filed Nov. 20, 1975, Ser. No. 633,668

Int. Cl.[2] F01L *1/18*

U.S. Cl. 123—90.35 **13 Claims**



1. A hydraulic lash adjuster for use with an internal combustion engine of the type having an overhead cam, a rocker arm having a socket, a lubrication system and a bore formed in the engine cylinder head in communication with the lubrication system, comprising:

a lash adjuster body having a lower portion adapted to be disposed within said cylinder head bore, said body having a stepped cylindrical exterior surface;

a plunger reciprocal within said body and having a central

cavity forming an oil reservoir, said plunger including a passage free fulcrum portion having a head receivable within the rocker arm socket;

means defining an oil inlet formed in said body and said plunger for placing said cavity in communication with said lubrication system; and

pressure reduction means formed as a part of the lash adjuster body for reducing the oil pressure within the oil reservoir below that of the lubrication system operating pressure

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4,009,697

AUTOMATIC IGNITION ADVANCE FOR AN INTERNAL COMBUSTION ENGINE

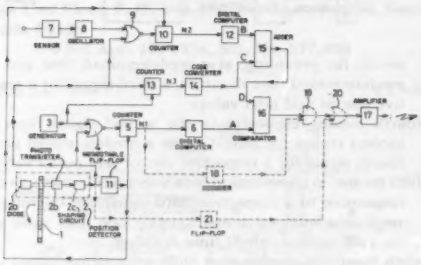
Louis Chateau, Rosny-sur-Bois, France, assignor to Ducellier & Cie, Paris, Cedex, France

Filed Jan. 21, 1975, Ser. No. 542,851

Claims priority, application France, Jan. 22, 1974, 74.02080

Int. Cl.² F02P *5/04*

U.S. Cl. 123—117 R **4 Claims**



1. A method of controlling ignition timing in an internal combustion engine having a shaft, comprising: generating a first digital signal as a function of the time taken for the shaft to rotate through a constant angle from a first reference position, said first signal varying with the shaft speed in accordance with the required speed/advance characteristic for the engine; generating in said same time a second digital signal corresponding to the value of another operational parameter of the engine; generating a third digital signal increasing continuously with the time elapsed after the shaft passes through a second reference position; adding together the second and third digital signals to derive a fourth digital signal; and generating a spark-triggering pulse when the first and fourth digital signals are equal.

4,009,698

INTERNAL COMBUSTION ENGINE OF IGNITION TIMING CONTROLLABLE TYPE

Takashi Kato; Eishi Oono, and Toshihiko Nakamura, all of Susono, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

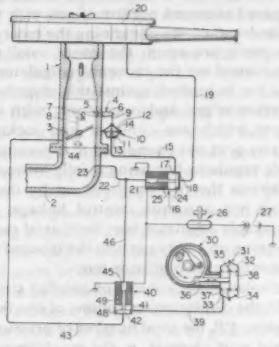
Filed Oct. 16, 1975, Ser. No. 622,903

Claims priority, application Japan, July 22, 1975, 50-88873

Int. Cl.² F02P *5/10*

U.S. Cl. 123—117 A **4 Claims**

1. An internal combustion engine of ignition timing controllable type for use with an automotive vehicle, comprising. an intake system including a carburetor having a throttle valve; a distributor; an ignition timing regulating device connected to said distributor and having a diaphragm chamber, to which a control vacuum is supplied; a first port from which a carburetor vacuum having relationship to the opening of said throttle valve is taken out; a second port from which an intake vacuum is taken out; and a first direction control valve operable in relationship to one of the speed of rotation of the internal combustion engine and the running speed of the automotive vehicle, the first- and second-named ports being selectively connected to the diaphragm chamber of said ignition timing regulating device by the first-named direction control valve, so that during a low speed driving condition of the internal combustion engine the intake vacuum taken out from the second-named port may be supplied to said diaphragm chamber to retard the ignition timing, so that during a high speed driving condition of the internal combusiton engine a low carburetor vacuum taken out from the first-named port may be supplied to said diaphragm chamber to advance the ignition timing, and so that upon deceleration from a high speed driving condition a high carburetor vacuum taken out from the first-named port may be supplied to said diaphragm chamber to retard the ignition timing.



4,009,699

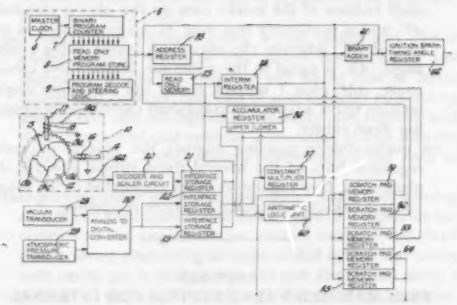
DIGITAL IGNITION SPARK TIMING ANGLE CONTROL WITH READ ONLY MEMORY

Lewis R. Hetzler; Gerald O. Huntzinger; William P. Winstead, III, and Thomas A. Zickel, all of Anderson, Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Jan. 19, 1976, Ser. No. 650,164

Int. Cl.² F02P *1/00*

U.S. Cl. 123—117 D **5 Claims**



1. An ignition spark timing control system for use with a spark ignition internal combustion engine and a sequence control arrangement comprising: a read only memory pre-programmed to produce an output binary signal representation of predetermined ignition spark timing angle based upon the instantaneous value of both of two selected engine operating parameters at each of a plurality of respective selected points within the range of values in response to respective input address signals whereby over the range of values of the two selected engine operating parameters the read only memory

generates a three-dimensional surface of ignition spark timing angles based upon the two selected engine parameter values; means for producing input address signals for said read only memory in response to binary signal representations of instantaneous values of said selected two engine operating parameters; means for applying said input address signals to said read only memory whereby the binary signal representation of an ignition spark timing angle is produced by said read only memory in response to each of said input address signals; and means effective to vary the binary signal representations of the ignition spark timing angles as retrieved from said read only memory in accordance with engine manifold vacuum in substantial inverse proportion to atmospheric pressure whereby said three-dimensional surface generated by said read only memory is tilted about a selected engine parameter value as an axis in an amount substantially inversely proportional to actual atmospheric pressure.

4,009,700

CONTROL ARRANGEMENT FOR THE RECONVEYANCE OF EXHAUST GASES

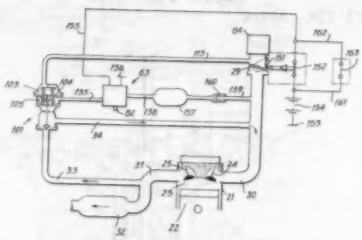
Uwe Engels; Günther Frohberg; Peter Klotzbach, all of Neuss; Ernst Kuhlen, Willich, and Helmut Rossel, Neuss, all of Germany, assignors to A. Pierburg Autogeratebau KG, Neuss, Germany

Filed Jan. 22, 1974, Ser. No. 435,587

Claims priority, application Germany, May 10, 1973, 2323515

Int. Cl.² F02B *25/06*

U.S. Cl. 123—119 A **7 Claims**



1. A control arrangement for the reconveyance of exhaust gas into an intake conduit of an internal combustion engine and including a dosing installation for a fuelair mixture in said intake conduit; comprising an adjusting device for determining the quantity of the reconveyed exhaust gas; a control conduit communicating with said adjusting device adapted to impart operating parameters thereto in response to a gas pressure present in said intake conduit; at least one control membrane in said adjusting device dividing the interior into separate control pressure chamber portions subjected to a differential pressure in response to said operating parameters; a control element fastened to said control membrane and adapted to be actuated thereby; a multiple-position valve being positioned in the flow path of said control conduit, said multiple-position valve being adapted to subject at least one of said control pressure chamber portions to a predetermined gas pressure for imparting control to said adjusting device over the flow of exhaust gas into said intake conduit; a second control membrane in said adjusting device in spaced relationship with and below said first control membrane and defining a control pressure chamber therebetween adapted to be subjected to a control pressure prevailing in the intake; means operatively connecting said first and second membranes; valve means in a reconveying line for influencing the quantity of reconveyed exhaust gas; said adjusting device having a control membrane connected to said valve means; the position of said multiple-position valve being dependent substantially on the position of the dosing installation in said intake; said control pressure chamber being bordered by said first control membrane and facing said second control membrane; said multiple-position valve being connected before the control pressure chambers; said membrane connecting means comprising a free-wheeling couplingmember adapted to facilitate relative movement between said first and second membranes.

4,009,701

INTERNAL COMBUSTION ENGINE HAVING PROVISIONS FOR HEATING THE FUEL-AIR MIXTURE BY MEANS OF THE EXHAUST

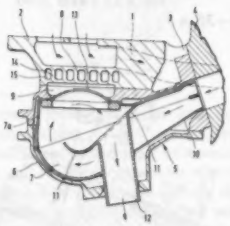
Max Ruf, Obereisesheim, and Johannes Steinwart, Obersulm-Willsbach, both of Germany, assignors to Audi NSU Auto Union Aktiengesellschaft, Germany

Filed May 20, 1976, Ser. No. 688,344

Claims priority, application Germany, May 22, 1975, 2522671

Int. Cl.² F02M *31/00*

U.S. Cl. 123—122 AC **6 Claims**



1. An internal combustion engine having an intake for the fuel-air mixture and an exhaust line, a device for pre-heating the fuel-air mixture by means of the engine exhaust comprising a portion of the intake and a portion of the exhaust line having a common wall for heat transfer, the heat-transfer wall having a plurality of through coolant passages and means for connecting the passages to a source of coolant when a certain operating temperature is reached.

4,009,702

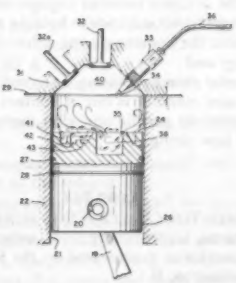
PISTON WITH TURBULENCE INDUCING FACE CONFIGURATION

Edward A. Mayer, Newburgh, N.Y., assignor to Texaco Inc., New York, N.Y.

Filed Nov. 15, 1974, Ser. No. 524,295

Int. Cl.² F02F *3/26*

U.S. Cl. 123—193 P **3 Claims**



1. In an internal combustion engine including at least one cylinder, for an expandable combustion chamber, a piston operably positioned for reciprocating motion in said cylinder and a fuel injector being actuatable to introduce a stream of fuel to said expandable combustion chamber, and valve means opening into said combustion chamber for introducing a

stream of air therethrough in a manner to cause said air to swirl rapidly about said combustion chamber,

means forming a cylindrical walled primary cavity in the face of said piston and defining an open chamber therein, to receive fuel and swirling air,

recess means formed into said piston face and positioned to receive a gaseous flow from said primary cavity during the piston power stroke, and defining at least one circular groove about said primary cavity,

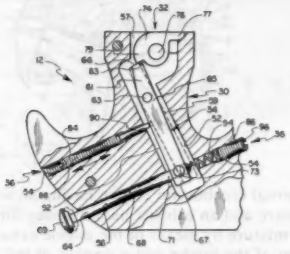
said at least one circular groove including an outwardly sloping wall connected with said piston face, and a substantially vertically sloping wall forming the periphery of said groove, whereby to facilitate intermixing of air with injected fuel to provide an improved combustion process.

4,009,703

BOW STRING TRIGGER RELEASE MECHANISM

Jerry L. Cunningham, Sr., 5837 Jones St., Wichita, Kans. 67217

Filed Dec. 17, 1974, Ser. No. 533,510
Int. Cl.² F41B *5/00*
U.S. Cl. 124—35 A **9 Claims**



1. A trigger release mechanism adapted to first grasp a bow string of a bow and arrow assembly and secondly release the bow string, comprising:

a. a housing assembly having an outer contour to be grasped by one's hand.

b. an actuator assembly mounted in said housing assembly;

c. said actuator assembly having an actuator member pivotally connected and a plunger pivotally connected to said actuator member and with inward pressure thereon causing pivoting of one end of said actuator member;

d. a cam assembly having a release cam member mounted in said housing assembly and releasably engagable with the other end of said actuator member;

e. said actuator member having a first pivoted position wherein the actuator member engages and holds said cam member against rotation while holding an entrapped bow string within the housing during a drawing operation of a bow string; and

f. said actuator member having a second position wherein said actuator member is out of contact with said release cam member to permit said cam member to pivot and release a bow string.

4,009,704

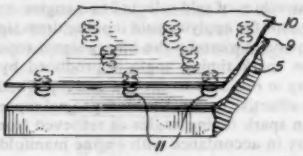
COOL-TOUCH COOKING SURFACES

Louis A. Marzetta, Gaithersburg, Md., assignor to The United States of America as represented by the Secretary of Commerce, Washington, D.C.

Division of Ser. No. 544,600, Jan. 27, 1975, abandoned. This application Aug. 17, 1976, Ser. No. 715,026
Int. Cl.² F24C *15/10*
U.S. Cl. 126—221 **1 Claim**

1. A cool-touch covering for the heated surface of a warming tray, hot plate, or other cooking appliance, comprising:

a pair of sheets of thermally stable material which are separated by a plurality of spring-like, thermally stable elements, one of said sheets being mounted on said heated surface;



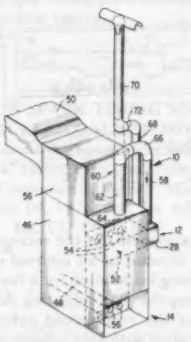
said spring-like elements being compressible under the weight of a cooking utensil and its contents to an extent sufficient to increase the thermal inertia of said sheets and elements by a factor of at least several hundred.

4,009,705

VENTING SYSTEM FOR A GAS-FIRED HEATING PLANT

Donald L. Smith, Salem, Ill., assignor to Thrifty-Vent, Inc., Salem, Ill.

Continuation-in-part of Ser. No. 549,059, Feb. 11, 1975, abandoned, which is a continuation-in-part of Ser. No. 442,334, Feb. 4, 1974, abandoned. This application May 23, 1975, Ser. No. 580,133
Int. Cl.² F23J *11/02*
U.S. Cl. 126—307 A **10 Claims**



1. In combination with a gas-fired heating lant having a base, an upper portion and having a combustion chamber provided with a flue outlet provided in the upper portion for the outlet passage of combustion gases to be conveyed to a chimney flue for the heating plant: a venting system for the combustion chamber comprising a first piping connected to the flue outlet, a second piping connected to the chimney flue, a diverter box vertically arranged relative to the heating plant exteriorly thereof and having an upper portion and a lower portion, said diverter box being connected to and intercommunicating both of said pipings at its upper portion and having a bottom provided with a substantial opening disposed well above the base of the heating plant at the upper portion of the heating plant with said opening being in constant free communication with the atmospheric air surrounding the heating plant which air enters the diverter box through the opening in the bottom as cold air to establish a cold air pressure head below the first piping and establish a heat lock to prevent the flow of heated air from the combustion chamber outlet of the heating plant and also to prevent down drafts from the chimney flue attempting to pass down through the second piping from reaching the combustion chamber of the heating plant.

4,009,706

SYNTHETIC ORGANIC FLOCCULANTS TO CLARIFY RAW SUGAR LIQUOR

Paul Eugene Shaughnessey, Huntingdon Valley, Pa., assignor to American Cyanamid Company, Stamford, Conn.

Filed June 18, 1976, Ser. No. 697,495
Int. Cl.² C13D *3/00*
U.S. Cl. 127—48 **10 Claims**

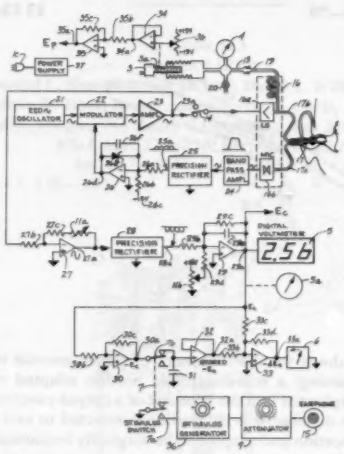
1. A process for refining a raw sugar liquor containing flocculatable impurities and ready for clarification which comprises adding to said sugar liquor an amount effective to flocculate said impurities of the combination of a cationic melamine:formaldehyde acid colloid and an anionic polyacrylamide containing from about 3 to 40 mole percent of its repeating units in the form of sodium acrylate groups and having a molecular weight of at least about 0.5 million and thereafter clarifying said sugar liquor.

4,009,707

AUTOMATIC ACOUSTIC IMPEDANCE METER

John W. Ward, Charlottesville, Va., assignor to Teledyne Avionics, a division of Teledyne Industries Inc., Charlottesville, Va.

Filed July 29, 1975, Ser. No. 600,067
Int. Cl.² A61B *5/12, 10/00*
U.S. Cl. 128—2 Z **5 Claims**



1. An automatic acoustic impedance meter apparatus for evaluating the middle ear and tympanic membrane system, said apparatus being comprised of:

sound source means, including oscillator means, modulator means, amplifier means and loud-speaker means, operationally interconnected;

sound sensor means, including microphone means, narrow-band amplifier means and rectifier means, operationally interconnected;

ear probe means for insertion in the subject's ear canal, including flexible probe tip pressure sealing means, tubular interconnecting means for acoustically connecting said sound source means and said sound sensor means to said ear probe means and thereby to the subject's ear canal;

inverse feedback means, including reference means and amplifier means to control said sound source means in response to the ear canal sound level sensed by said sound sensor means, thereby maintaining an unchanging sound level in the subject's ear canal regardless of the compliance thereof;

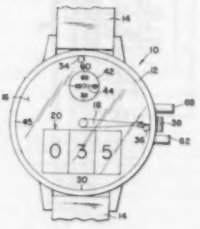
measurement means, including compliance analog voltage determining means responsive to the electrical excitation of said loud-speaker means, thereby obtaining a compliance analog voltage representative of the subject's ear canal compliance and including voltmeter means to measure said compliance analog voltage as a measure of the subject's ear canal compliance.

4,009,708

PULSE RATE RECORDER

John J. Fay, Jr., 24 Drake Lane, Levittown, N.Y. 11756

Filed May 29, 1975, Ser. No. 581,772
Int. Cl.² A61B *5/02*
U.S. Cl. 128—2.05 P **2 Claims**



1. A self contained circulatory pulse rate measuring and indicating device comprising: a case; means carried by said case for securing said case to the wrist of a wearer; said case having a front face and a back face; a pulse transducer carried on said back face for contact with said wrist; a digital counter means within said case; a digital display on said front face driven by said counter means; a sweep second hand on said front face; electric motor means within said casing for drivingly rotating said hand at a predetermined rate, first and second stops angularly disposed about said hand for engagement by said hand when said hand is in predetermined orientations; said first stop being fixedly positioned at one angular position; gear train means for angularly moving said second stop to an adjustable angular position; said hand and said stops forming a portion of a switch means for electrically energizing said motor means and for coupling said transducer means for indexing said counter only when said hand is positioned between said stops.

4,009,709

APPARATUS AND PROCESS FOR DETERMINING SYSTOLIC PRESSURE

William Trevor Link; Henry Ferdinand Rugge, both of Berkeley, and William David Jansen, Menlo Park, all of Calif., assignors to American Optical Corporation, Southbridge, Mass.

Filed May 15, 1975, Ser. No. 578,047
Int. Cl.² A61B *5/02*
U.S. Cl. 128—2.05 A **15 Claims**

1. An apparatus for determining systolic pressure, comprising:

a pressure cuff attachable to a living test subject adjacent a blood vessel;

means for changing pressure in the cuff and thereby applying pressure to the subject;

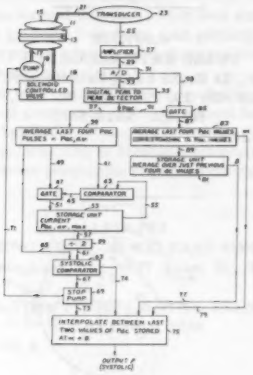
means communicating with said cuff for measuring a quantity proportional to a time-dependent fluctuating component representative of the pulsatile pressure within the blood vessel, said means having a frequency response of at least about five times the pulse rate of the subject whereby said quantity is proportional to the amplitude of said pulsatile pressure;

means for determining the maximum value attained by said quantity as the applied pressure is changed;

means for storing a representation of said maximum value;

means for determining when said quantity is substantially

equal to about one-half of said maximum value for an applied pressure greater than the pressure applied when said maximum value results; and



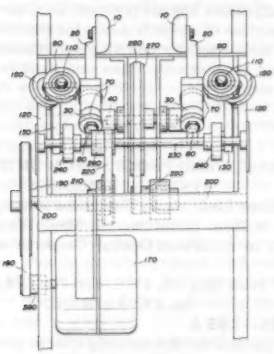
means for reading out applied pressure corresponding to said quantity being substantially equal to about one-half of said maximum value, said read-out pressure corresponding to the systolic pressure of said subject.

4,009,710

ELECTROMASSAGER

Nichimu Inada, 4-25, Morofuku 5-chome, Daito, Osaka, Japan

Filed July 10, 1975, Ser. No. 594,948
Claims priority, application Japan, July 11, 1974, 49-79359
Int. Cl.² A61H *7/00*
U.S. Cl. 128—44 **3 Claims**



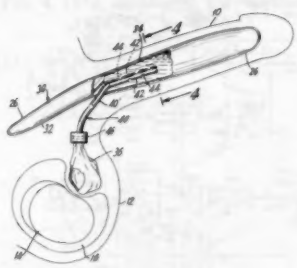
1. An electromassager device comprising in combination: a support structure; a reversible drive means for imparting a driving force, mounted on the support structure; a massaging means mounted on the support structutre, drivably connected to the drive means and for massaging function and including arm elements, a separate massaging ball being attached at an end portion of each one of the arm elements, a projection extending outwardly from a middle portion of each arm element, drive shafts connected to be driven by the drive means, a separate slip-clutch gear separately driven one by each of said drive shafts and thereby adapted to drivably impart a tapping movement, and a separate eccentrically mounted cam in operative association with each shaft and slip-clutch gear thereof, said eccentrically mounted cams being drivable through its respective slip-clutch gear, and a base of each arm being positioned for movement in a vertical direction mounted on an end of one of the drive shafts for each arm element, each respective arm element being mounted on one of the cams, at least one arm element per cam, the support structure having side plates; and swing plates, inclined plates, and shift cams, each said projection being mounted on the side plates by spherical bearings and connected thereby to the inclined plates, the inclined plates being affixed to the swing plates by connection through the shift cams, said shift cams being pivotably mounted on the support structure and positioned for movement along a substantially upright plane substantially parallel to flat faces of the side plates of the frame; and the reversible drive means further providing for optional alternate movements forwardly or reversibly of said drive shafts adapted for thereby movement of the swing plates to give the tapping movement, and for alternately reversibly giving movement in varying planes and speeds of massaging movements of the massaging balls whereby the massaging balls are movable along varying planes and parameters.

4,009,711

PENILE PROSTHESIS FOR THE MANAGEMENT OF ERECTILE IMPOTENCE

Aurelio C. Uson, 225 Maple St., Englewood, Bergen County, N.J. 07631

Filed Mar. 17, 1976, Ser. No. 667,532
Int. Cl.² A61F *5/00*
U.S. Cl. 128—79 **13 Claims**



1. A prosthesis for the treatment of penile erectile impotence comprising: a non-distensible portion adapted to be surgically implanted into the root end of a corpus cavernosum of a penis; a distensible body portion connected to said non-distensible portion and adapted to be surgically implanted into the pendulous segment of said corpus cavernosum; and fluid supply means connected to said distensible body portion.

4,009,712

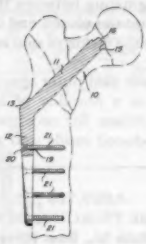
FLUTED HIP NAIL IMPLANT SYSTEM FOR ORTHOPAEDIC SURGERY

Albert H. Burstein, Shaker Heights, and Kingsbury G. Heiple, Cleveland, both of Ohio, assignors to The Sampson Corporation, Pittsburgh, Pa.

Filed Aug. 7, 1975, Ser. No. 602,725
Int. Cl.² A61F *5/04*
U.S. Cl. 128—92 BA **14 Claims**

1. A surgical implant system for use in repair of fractures of the hip comprising a one-piece implant having an integral hip nail portion and bone plate portion, said portions being disposed at an obtuse angle relative to each other, said hip nail portion being of solid construction throughout and provided with a plurality of longitudinal flutes on its surface each terminating in a sharp cutting point and adapted to be driven into the proximal extremity of the femur, said bone plate being elongated having a concave inner surface and adapted to rest against the outer shaft of the femur, said hip nail portion and said bone plate portion terminating at a widened junction

area, an impactor/extractor tool, means on the junction area for attachment of one end of said tool, means on the other end of said tool adapted to receive impact and extractive forces to force said hip nail portion into the femur, and a bone clamping tool for holding the bone plate portion against the femur shaft,



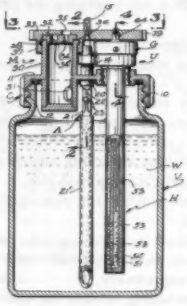
said bone plate portion having at least one buttress on the outer surface thereof, means on said last named tool adapted to fit in said buttress, a clamp means on said last-named tool, and means to apply force to said clamp means and said means fitted in said buttress to move the same towards each other in clamping relation.

4,009,713

NEBULIZER

Raymond L. Simmons, San Jacinto; David E. Williams, Hemet; Edwin D. Hoyt, Hemet, and Eugene B. Davis, Hemet, all of Calif., assignors to Rama Corporation, San Jacinto, Calif.

Filed Apr. 23, 1976, Ser. No. 679,520
Int. Cl.² A61M *16/00;* **B05B** *1/24*
U.S. Cl. 128—193 **15 Claims**



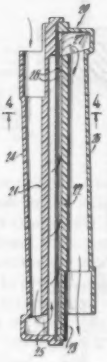
1. A nebulizer comprising a closed vessel, a supply of water in the vessel, oxygen supply means connected with a source of oxygen under pressure and delivering oxygen into the vessel, a resistance heater related to the vessel to heat the water in the vessel, control means controlling the heat output of the heater and positioned at the exterior of the vessel, air supply means communicating with the interior of the vessel and including air metering means controlling the flow of air into the vessel, mixing means within the vessel to commingle water, air and oxygen within the vessel and to effect tempering and humidifying the air and oxygen, delivery means conducting oxygen and oxygen-enriched air mixtures from the vessel, said control means for the heater and for the air metering means having movable control parts and drive means connected with and between said parts and establishing driving engagement therebetween whereby both of said parts are moved and their related means are adjusted when one of said parts is moved to adjust its related means.

4,009,714

INTRAVENOUS SOLUTION FILTER UNIT

Kurt Finn Hammer, Camarillo, Calif., assignor to Johnson & Johnson, New Brunswick, N.J. and Purolator, Inc.,, Del.

Filed July 30, 1975, Ser. No. 600,673
Int. Cl.² A61M *5/16*
U.S. Cl. 128—214 R **5 Claims**



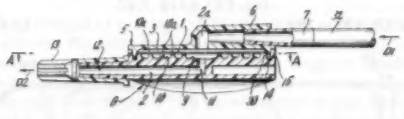
1. A self-priming filter unit for filtering intravenous solution comprising; a pair of rectangular housing members, each of said members having two parallel short sides and two parallel longer sides, a rectangular filter medium coextensive with said housing members and sealed at its periphery to the housing members, said housing members being sealed to each other at the periphery of said members, the upstream housing member having an inlet along the short side thereof at the bottom portion of the filter unit, said upstream housing member having an integral tubular conduit on the outside surface of said member extending from said inlet to the upper portion of said filter unit, the downstream housing member having an outlet along the short side thereof at the upper portion of the filter unit, the inner surface of said downstream housing member containing a plurality of ridges extending from the bottom portion of the filter unit to the outlet, and said downstream housing member having an integral tubular conduit on the outside surface thereof extending from said outlet to the bottom portion of the filter unit.

4,009,715

FILTER FOR INFUSION AND TRANSFUSION APPARATUS

Hans-Jürgen Forberg, Lensahn, Holst; Hans-Joachim Haese, Thomstorf, and Herbert Münz, Neustadt, Holst, all of Germany, assignors to Transcodan Sven Husted-Andersen, Germany

Filed Aug. 22, 1975, Ser. No. 606,978
Claims priority, application Germany, Aug. 29, 1974, 2441329; Mar. 8, 1975, 2510148
Int. Cl.² A61M *5/16*
U.S. Cl. 128—214 R **16 Claims**

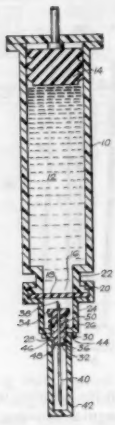


1. A filter particularly for transfusion and infusion apparatus, comprising a housing having an inlet passage, a discharge passage, and a single closed continuous spiral flow passage between said inlet passage and said discharge passage, a filtering material located between said spiral passage and said inlet, said outlet passage communicating with the center of said spiral passage.

4,009,716
NEEDLE-HUB ASSEMBLY FOR SYRINGES

Milton J. Cohen, 9201 Persimmon Tree Road, Potomac, Md. 20854

Filed Feb. 17, 1976, Ser. No. 658,613
Int. Cl.² A61M 5/32
U.S. Cl. 128—218 NV 9 Claims

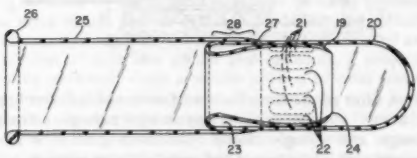


1. In a disposable hypodermic syringe having a barrel open at the forward end, a sealing disc fixed in sealing relation over the open end of the barrel, a cup member fixed onto the open end of the barrel, a hub member confined within the cup for movement in the direction toward and away from the open end of the barrel between extended and retracted positions, a hollow needle extending through the hub with an inner end portion extending inwardly beyond the hub and an outer portion extending forwardly beyond the hub, and a cover for enclosure of the needle portion extending forwardly of the hub, the improvement comprising means wherein the hub is located within the cup member normally intermediate between extended and retracted positions with the inner end of the needle spaced a short distance forwardly of the sealing disc and through the sealing disc when in retracted position, resilient means in position to be tensioned in response to movement of the hub from normal to extended position, and means releasably latching the cover with the hub for displacement of the hub from normal toward extended position responsive to displacement of the cover to expose the needle whereby, when the cover becomes disengaged from the hub, the tensioned resilient means becomes effective to thrust the needle and hub toward retracted position to pierce the sealing disc.

4,009,717
RETAINING FLUIDS

Clayton H. Allen, 651 Concord Ave., Cambridge, Mass. 02138

Filed June 27, 1975, Ser. No. 590,810
Int. Cl.² A61F 5/42
U.S. Cl. 128—294 12 Claims

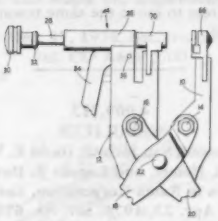


1. Prophylactic apparatus comprising,
means defining an outer sheath in the form of a thin rubber tube closed at one end and open at the other and an inner sheath of thin rubber open at both ends,
and means for establishing liquid sealing relationship between said inner and outer sheaths near the open end of said outer sheath to form at least a double wall near said open end with the region between defining a reservoir for retaining fluids originating between the inner opening of said inner sheath and the closed end of said outer sheath while the region on the inside of said inner sheath remains essentially dry,
said inner sheath inside said outer sheath being secured to said outer sheath at a plurality of locations to form a double wall with means for receiving and limiting the travel of fluids produced inside said apparatus.

4,009,718
EARLOBE PIERCING DEVICE

John A. Hastings, 31 Main St., Bass River, Mass. 02664

Continuation-in-part of Ser. No. 446,749, Feb. 28, 1974. This application Mar. 17, 1975, Ser. No. 559,034
Int. Cl.² A61B 17/00
U.S. Cl. 128—330 8 Claims



1. A device for piercing an earlobe with a pin having a head at one end and a point at the other end and for securing the pin to the earlobe with a nut engaging the pointed end of the pin comprising:
a first means for supporting the pin,
a second means for supporting spaced from the first supporting means,
means supportively interconnecting the first and second supporting means for permitting relative movement therebetween,
a first disposable holder including an open barrel for slidingly receiving and carrying said pin,
a second disposable holder for removably receiving and carrying said nut,
said disposable holders each having base portions shaped to be removably inter-engaged with said first means and second means, respectively,
said first means including means for removably receiving the first holder,
and said second means including means for removably receiving the second holder,
and means supporting said plunger means on said first means independent of said holders for movement of said plunger means into engagement with said pin.

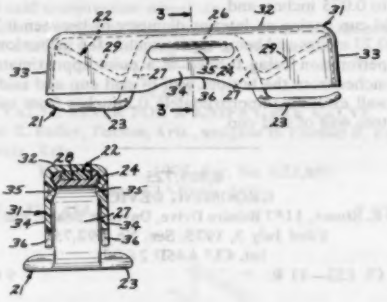
4,009,719
PROTECTIVE COVER FOR SUTURE BRIDGE

Harold D. Kletschka; Edson H. Rafferty, both of Minneapolis, and Earl W. Clausen, Minnetonka, all of Minn., assignors to Bio-Medicus, Inc., Minnetonka, Minn.

Filed May 12, 1975, Ser. No. 576,358
Int. Cl.² A61B 17/04
U.S. Cl. 128—335 10 Claims

1. A cover for surgical bridges of the type comprising spaced apart skin-engaging foot portions joined by a bridge portion for supporting incision sutures under tension; said

cover having wall structure adapted to enclose a suture engaging portion of a bridge in outwardly spaced relation to the foot portions of the bridge, said wall structure including a generally flat top wall, opposed generally flat side walls, and at least one



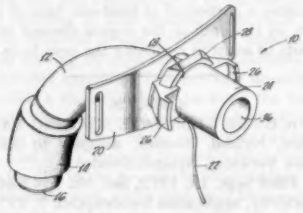
end wall, said cover walls having smooth outer surfaces and rounded corners, said cover including snap fastener elements for releasably holding said cover in enclosing relationship to said sature engaging portion of the bridge.

4,009,720

WEDGE SEAL FOR A TRACHEOTOMY TUBE

Norman C. Crandall, Diamond Bar, Calif., assignor to Shiley Laboratories, Inc., Santa Ana, Calif.

Filed Aug. 14, 1975, Ser. No. 604,640
Int. Cl.² A61M *25/00*
U.S. Cl. 128—351 **8 Claims**



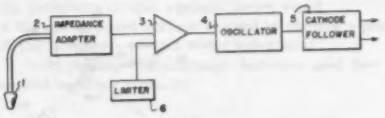
1. A tracheotomy tube comprising:
an outer cannula;
a removable inner cannula;
a coupling to an outside fluid supply;
a first wedge-like sealing surface of plastic material located adjacent one end of said inner cannula, said sealing surface sloping radially away from the exterior surface of said inner cannula in a direction along said inner cannula; and
a second wedge-like sealing surface of plastic material located adjacent said first wedge-like sealing surface and sloping radially away from the exterior surface of said inner cannula in a direction opposite said direction of said wedge-like sealing surface along said inner cannula;
an internal edge on the end of said outer cannula bearing on said first wedge-like sealing surface and flexing under only slight axial, nonrotational force to seal said inner cannula with said outer cannula; and
an internal edge on said coupling bearing on said second wedge-like sealing surface and flexing under only slight axial, non-rotational force to seal said coupling with said inner cannula when said inner cannula is positioned completly within said outer cannula.

4,009,721

ARTIFICIAL PACEMAKER

Mario Alcidi, Florence, Italy, assignor to Pacer S.n.C. of Cerchiai Vanna & C., Italy

Filed Apr. 23, 1976, Ser. No. 679,742
Claims priority, application Italy, Apr. 24, 1975, 9412/75
Int. Cl.² A61N *1/36*
U.S. Cl. 128—419 PG **16 Claims**



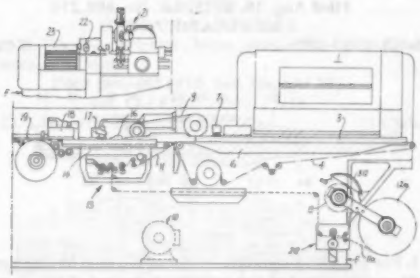
1. In an artificial pacemaker including oscillator means providing electrical stimuli to the heart at the oscillator frequency, the improvement comprising, in combination, detector means operable to detect instantaneous variations of the pH of the blood as a function of the effort exerted by the wearer of the pacemaker to provide an electrical output which is a function of the instantaneous pH variation; and means connecting said detector means to said oscillator means to control the frequency of said oscillator means as a function of the detected pH of the blood.

4,009,722

METHOD AND MACHINE FOR MAKING CIGARETTES WITH COMPOSITE FILLERS

Günter Wahle, Reinbeck; Rolf Dahlgrün, Tornesch, and Dieter Ludszeweit, Hamburg, all of Germany, assignors to Hauni-Werke Korber & Co., KG, Hamburg, Germany

Filed Sept. 11, 1975, Ser. No. 612,584
Claims priority, application Germany, Sept. 26, 1974, 2445856
Int. Cl.² A24C *5/18*
U.S. Cl. 131—39 **18 Claims**



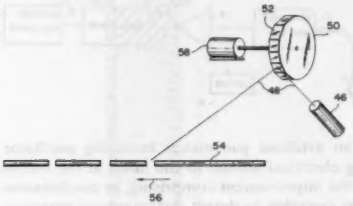
1. In a method of making rod-like smokers' products of the type wherein the filler consists of first and second particulate fibrous materials, particularly of making smokers' products wherein the filler consists of two types of tobacco, the steps of feeding said first material into an elongated stream building zone so as to convert said first material into a continuous first stream; feeding into said zone discrete batches of said second material at regular intervals to form a composite stream wherein one of said materials overlies the other of said materials in the region of each of said batches; and removing said first material from each of said regions to thereby convert said composite stream into a filler wherein said batches alternate with filler portions consisting of said first material.

4,009,723

METHOD FOR CUTTING A TOBACCO PRODUCT ROD AND INCREASING THE END STRENGTH THEREOF

George E. Stungis, and Steven L. Merker, both of Louisville, Ky., assignors to Brown & Williamson Tobacco Corporation, Louisville, Ky.

Filed Jan. 13, 1975, Ser. No. 540,634
Int. Cl.² A24C *5/28*
U.S. Cl. 131—84 R **10 Claims**



1. An improved method of cutting a continuous rod of tobacco product for the manufacture of cigarettes with a laser beam without requiring the presence of an inert gas at the point of cutting into predetermined lengths comprising the steps of

a. forming a continuous rod having tobacco product shreds therein;

b. continuously moving the rod at a predetermined speed; and

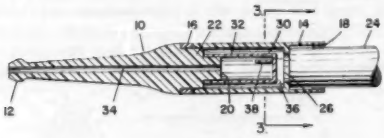
c. cutting the rod at predetermined intervals with a laser beam under essentially atmospheric conditions in a direction such that the cut is substantially transverse to the longitudinal axis of the rod, the laser beam having a power of at least 1,000 watts and being in contact with the rod for a time period not greater than 15 milliseconds thereby causing only local thermalization of the product in the region adjacent to the path followed by the laser beam.

4,009,724

AIR VENT PARTICLE FILTER CAP

Jack P. Prohoroff, Orange, Calif., assignor to Armando C. Hernandez, Anaheim, Calif.

Filed Aug. 18, 1975, Ser. No. 605,274
Int. Cl.² A24F *13/02*
U.S. Cl. 131—187 **4 Claims**



1. For use with a cigarette holder of the kind having a recess at its upstream end of size to receive the end of the cigarette, a bit at its downstream end, a cavity intermediate its ends in communication with said recess, a draw passage for smoke extending through said holder from said cavity to said bit, and conformations at the wall of said cavity for retaining a filter in said cavity such that the exterior of the filter is in communication with said recess and such that the interior of said filter is in communication with said draw passage, a disposable filter comprising:

a cup having a generally cylindrical side wall and an imperforate end wall;

said side wall having a perforation formed therethrough;

a baffle wall extending at its upstream end from said end wall into the interior of said cup and spaced from said side wall and disposed such that an axial line through said perforation intersects a midregion of said baffle wall, the face of said baffle wall toward said perforation being substantially parallel with the central axis of said cup;

the surface of said baffle wall being spaced from the interior surface of the side wall of said cup a distance from 0.025 to 0.075 inches; and

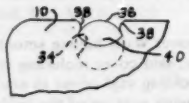
said cup having an interior diameter of between 0.20 and 0.27 inches and being approximately 0.5 inches long, said perforation being formed at a point approximately 0.1 inches from the bottom wall of said cup and said baffle wall extending approximately 0.2 inches from said bottom wall of said cup.

4,009,725

GROOMING DEVICE

Fred E. Stuart, 1157 Belaire Drive, Daytona Beach, Fla. 32018

Filed July 3, 1975, Ser. No. 592,759
Int. Cl.³ A45D *24/00*
U.S. Cl. 132—11 R **9 Claims**



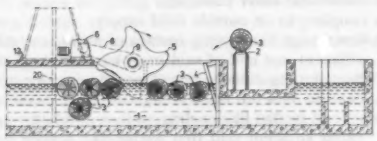
1. In a personal grooming device; a generally flat substantially rectangular member adapted for being carried in the pocket, said member being in the form of a comb element having a back portion extending along one lateral edge of the member and teeth connected to and projecting from the back portion in the plane of said member, a brush element mounted on said back portion and upstanding therefrom substantially at right angles to the plane of said member and near the base ends of said teeth, said back portion of said comb element including recess means for detachably receiving a coin, said recess means including side portions for gripping engagement with spaced points on the periphery of the coin, said recess means exposing a portion of at least one face of the coin for engagement of the coin in the region thereof between said spaced points to assist in removing the coin from the recess.

4,009,726

DEVICE FOR ELONGATE SOAKING BASINS

Rolf Ekholm, Nyland, Sweden, assignor to AB Hammars Mekaniska Verkstad, Nyland, Sweden

Filed Sept. 19, 1975, Ser. No. 614,884
Claims priority, application Sweden, Oct. 7, 1974, 7412584
Int. Cl.² B08B *3/04*
U.S. Cl. 134—46 **11 Claims**



1. A device for an elongate soaking basin for transverse feeding of pieces of lumber, preferably lumber intended for veneer production, in the longitudinal direction of the basin, including a compression wheel arranged at the lumber infeeding end of said basin to feed said pieces of lumber forward in the basin to a lumber outfeeding end, comprising:

a vertical screen vertically movable into and out of said basin by a motor, said screen supported by a frame and having its plane transverse to the longitudinal direction of said basin;

said frame being longitudinally driveable above said basin

by a driving motor, to move said screen between its initial position at said compression wheel and its end position at said lumber outfeeding end of said basin;

said frame including means for providing compression of said pieces of lumber against one of said outfeeding end or said compression wheel; and

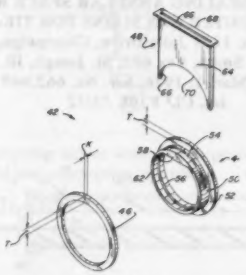
said frame including means responsive to said compression for starting and stopping said driving motor.

4,009,727

VALVE LINER FOR A KNIFE GATE VALVE

Thomas R. Bailey, Tucson, Ariz., assignor to Thomas R. Bailey, Phoenix, Ariz.

Filed Oct. 20, 1975, Ser. No. 623,800
Int. Cl.² F16K *3/02*
U.S. Cl. 137—454.2 **7 Claims**



5. In a flow-through valve assembly having a housing defining a opening through which fluid flow is selectively controlled by a slide gate adapted to be slid transversely of said opening through a slot in said housing, wherein said housing includes connection means for connecting the valve assembly to the end of a fluid flow conduit, the improvement comprising a removable liner including a main body liner member conforming in external size and configuration to the size and configuration of an opening in said housing, said main body liner member being received in said opening to separate the housing from fluid flowing through said valve assembly, said main body liner member extending between said housing and conduit to establish a fluid-tight seal between the housing and conduit, positioning means on said main body liner member for maintaining the position of the main body liner member in the housing, and a slot through the main body liner member aligned with the slot in the housing to allow sliding movement of said gate therethrough, and a slide gate liner member positioned in the slot in said housing, said slide gate liner member having a slot therethrough slideably receiving said slide gate, and an edge conforming in size and configuration to the external size and configuration of the main body liner member at the location where said slot through the main body liner member is located to allow continuous engagement of the liner members at this location, said slot in the liner member being aligned to allow selective sliding movement of the slide gate through said members.

4,009,728

WATER VALVE ASSEMBLY

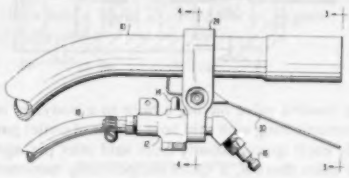
Carl Parise, Reno, Nev., assignor to Parise & Sons, Inc., Reno, Nev.

Filed Mar. 9, 1976, Ser. No. 665,218
Int. Cl.² A47L *9/24*
U.S. Cl. 137—594 **6 Claims**

1. A water valve assembly for mounting on the vacuum return wand of a steam cleaner a water valve of the type having an outwardly biased actuating member which prevents the passage of water in its normal position and permits the passage of water when pressed inwardly, said assembly comprising:

a. a first mounting bracket having therein
  i. a first concave surface shaped to receive a portion of the periphery of said vacuum steam wand,
  ii. a second concave surface shaped to receive a portion of the periphery of said water valve, and
  iii. a hole passing therethrough between said first and secodnd concave surfaces;

b. a second mounting bracket having therein
  i. a first concave surface shaped to receive a portion of the periphery of said vacuum steam wand,
  ii. a second concave surface shaped to receive a portion of the periphery of said water valve, and
  iii. a hole passing therethrough between said first and second concave surfaces;



c. a shaft passing through the holes in said first and second mounting brackets;

d. a lever arm
  i. mounted on said shaft between said first and second mounting brackets;
  ii. one end of which is positioned to actuate the outwardly biased actuating member of said water valve, and
  iii. the other end of which is positioned so that it can be comfortably actuated by the fingers of a hand grasping said vacuum return wand during use of said steam cleaner; and

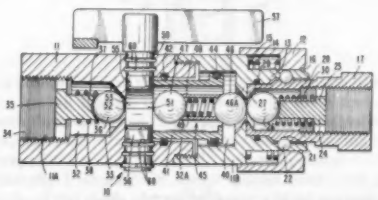
e. means for urging said first and second mounting brackets together so as to firmly grasp said vacuum return wand and said water valve therebetween.

4,009,729

HYDRAULIC COUPLER

Albam M. Vik, New Brighton, Minn., assignor to Dempco, Inc., Minneapolis, Minn.

Filed Oct. 20, 1975, Ser. No. 623,791
Int. Cl.² F16L *29/00, 37/28*
U.S. Cl. 137—614.05 **11 Claims**



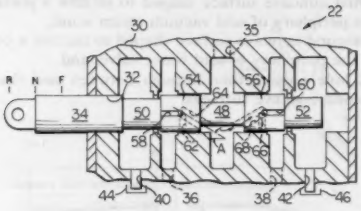
1. In a hydraulic coupler attachment device including a coupler body having an interior passageway, a manually controllable inlet check valve, and a manually operable outlet check valve in said interior passageway, said inlet check valve and said outlet check valve defining a chamber on the interior of said coupler body between said valves, the improvement comprising a movable wall defining a portion of said chamber, and means exterior of the chamber operatively associated with said movable wall to move the wall to enlarge said chamber at selected times.

4,009,730

COMBINATION PRESSURE CONTROL SELECTOR VALVE

James G. Starling, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Oct. 3, 1975, Ser. No. 619,339
Int. Cl.² F15B *13/04*
U.S. Cl. 137—625.69 **7 Claims**



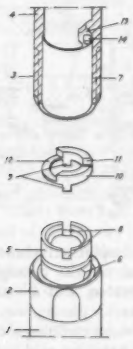
1. In a control valve having a bore in a body, an inlet passage communicating with said bore, a pair of outlet passages in said body each spaced axially from said inlet passage and on opposite sides thereof, a spool reciprocably mounted in said bore to close off communication between said inlet and outlet passages, said spool having a central, annular groove arranged to open such communication upon axial movement of said spool, said spool having a pair of laterally disposed annular grooves on said spool opposite sides of said central groove so as to define a pair of lands, and wherein the improvement comprises means for effecting modulated flow through the valve comprising in combination a tapered metering slot means on each of said lands extending axially from a lateral groove to a centrally disposed point on said land, and passage means in each of said lands communicating a centrally disposed point on said land with a respective laterally disposed groove, wherein said passagemeans comprises a radially directed bore centrally disposed in said land intersecting an angularly directed bore opening into said central groove.

4,009,731

PIVOTING DISCHARGE FOR SANITARY FLOW FITTINGS

Paul Denz, Lendringsen, Germany, assignor to Friedrich Grohe Armaturenfabrik, Hemer, Germany

Filed July 14, 1975, Ser. No. 595,870
Claims priority, application Germany, July 15, 1974, 2433915
Int. Cl.² F16L *9/22, 25/00*
U.S. Cl. 138—37 **5 Claims**



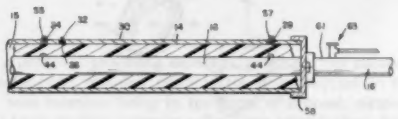
1. A tubular discharge fitting assembly comprising in combination, a discharge tube member, a discharge fitting member mounted adjacent the output end of said discharge tube member allowing detachment of the fitting member from the tube member, and a ring insertable removably between said tube member and said fitting member allowing flow from said tube member through the ring and the fitting member; and further including means on one of said members mating with an irregular portion of said ring to prevent relative rotation between the ring and the one member, means on the other member mating with a further irregular portion of the ring for deterring relative rotation between said ring and said other member within a predetermined angular orientation of said other member and said ring, said further irregular portion on said ring allowing relative rotation between said ring and said other member through an arc of predetermined extent, whereby rotation of the fitting member relative to the tube member is controlled by said relative rotation.

4,009,732

METHODS OF SEALING ANNULAR SPACE BETWEEN INNER AND OUTER GAS MAINS FOR TIE-OVERS

Luther W. Martin, 1221 Julie Drive, Champaign, Ill. 61820, and Richard L. Smith, Box 682, St. Joseph, Ill. 61873

Filed Mar. 1, 1976, Ser. No. 662,949
Int. Cl.² F16L *55/12*
U.S. Cl. 138—97 **10 Claims**



1. A method of tying over an individual customer service connection from a live outer gas main to an inner gas main inserted within the live outer gas main comprising the steps of centering the inner main within the outer main, defining an annular region within the annular space between the inner and outer mains, said region being upstream from the customer service connection between the customer service connection and the source of low pressure gas for the outer main, opening a sidewall of the live outer main intermediate the ends of said annular region, introducing into said opening an amount of a high-density liquid foam sufficient to fill said annular region, allowing the foam to harden to prevent gas from flowing downstream below said annular region to the service connection to be tied over, cutting away a section of outer main downstream from the annular region, and placing the new customer service connection through the sidewall of the inner main exposed by cutting away the outer main.

4,009,733

PRESSURE HOSE

Ernst Schnabel, Offheimer Weg 5, 6250 Limburg, Germany

Filed Aug. 29, 1975, Ser. No. 609,152
Claims priority, application Germany, Feb. 18, 1975, 2506874
Int. Cl.² F16L *55/00*
U.S. Cl. 138—103 **10 Claims**

1. A pressure hose, particularly for carrying the cooling water for the rotor of a generator, comprising an elongated hose member of electrically insulating elastomeric material and having longitudinally spaced ends; a pressure-resistant armor of electrically conductive material and surrounding said hose member; two connecting members each at one of said ends of said hose member and each having a nipple extending into said hose member at the respective end and being formed with an external reinforcing bead; mounting sleeves surrounding said armor at said ends of said hose member and each having a longitudinally intermediate portion which surrounds said bead of the respective associated nipple; and means for electrically insulating said armor from at least one of said

connecting members, including a respective end portion of said hose member which extends longitudinally beyond the

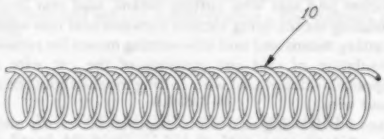
respective mounting sleeve and is interposed between said armor and said one connecting member.

4,009,734

COILED TUBING

Dennis W. Sullivan, Willoughby Hills, Ohio, assignor to Parker-Hannifin Corporation, Cleveland, Ohio

Filed Feb. 26, 1976, Ser. No. 661,535
Int. Cl.² F16L *11/00*
U.S. Cl. 138—125 **8 Claims**



1. A self-retracting flexible coiled tubing structure to transmit fluids under pressure comprising an extruded seamless tube of a mixture of a chemically extended polyester and from about 10% to about 50% of a polybutylene terephthalate polymer.

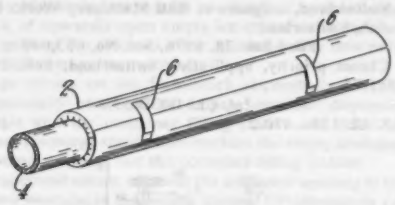
4,009,735

THERMAL INSULATION

Gordon P. Pinsky, Columbus, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Continuation of Ser. No. 409,109, Oct. 24, 1973, abandoned. This application Oct. 2, 1974, Ser. No. 511,392
Int. Cl.² F16L *9/14*
U.S. Cl. 138—147 **4 Claims**

1. Readily removable and replaceable rewettable thermal insulation for use on vessels and piping within reactor containment areas of nuclear power plants comprising high temperature resistant mineral fiber or glass fiber encapsulated within rewettable, high temperature resistant, asbestos free glass cloth held in place with a plurality of spaced quick release and engage feasteners, wherein the glass cloth can withstand repeated wettings from spray systems within the reactor containment areas of nuclear power plants and wherein the fasteners are two woven nylon, hook and loop mating strips, wherein



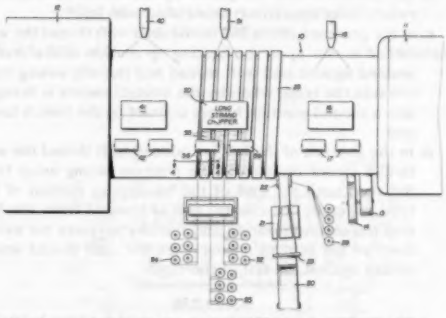
the glass cloth has a finish of a leachable, organic silicate carried in a fatty and mineral oil vehicle.

4,009,736

SANDWICH WALL GLASS FIBER REINFORCED CONSTRUCTION AND METHOD OF MAKING SAME

Agnar Gilbu, Conroe, Tex., assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Dec. 6, 1974, Ser. No. 530,263
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976
Int. Cl.² F16L *9/00*
U.S. Cl. 138—177 **12 Claims**



1. In a composite wall structure for fluid retention, the wall structure having spaced, concentric tubular inner and outer shells each formed of glass fiber reinforced resinous polymeric material, the improvement of an intermediate spacing structure interposed between said shells and comprising:

1. generally U-shaped rib forms spaced from each other axially of the shells and each having a bight portion adjacent the outer shell and a pair of spaced, generally parallel leg portions extending from the bight portion toward the inner shell, and
2. ribs interspersed with said rib forms and integrally joining said shells to each other, said ribs each comprising a glass fiber mat covering leg portions of adjacent rib forms, filament-wound glass rovings retaining a mat portion bridging adjacent rib forms against the inner shell, and resinous polymeric material impregnating both the mat and said rovings.

4,009,737

FILLING THREAD STOP MOTION DEVICE FOR A LOOM

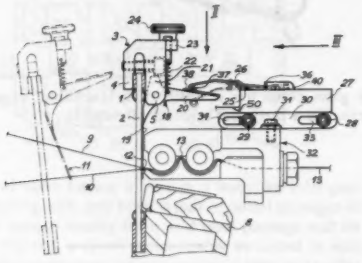
Willy Rohr, Hinwil, and Viktor Smutny, Wetzikon, both of Switzerland, assignors to Ruti Machinery Works Ltd., Zurich, Switzerland

Filed Jan. 28, 1976, Ser. No. 653,040

Claims priority, application Switzerland, Feb. 28, 1975, 2551/75

Int. Cl.² D03D *51/34*

U.S. Cl. 139—370.2 **10 Claims**



1. A filling thread stop-motion device for a loom comprising a reed, a weft thread sensor for detecting the presence or absence of the last introduced weft thread and a control means for stopping the loom upon sensing the absence of the last introduced weft thread by said weft thread sensor, characterized by the fact that

a. the weft thread sensor is formed from one arm of an angle lever swingably arranged on the reed with the other arm of the angle lever forming a control arm for actuating said control means, said angle lever being subjected to a biasing means, said biasing means swinging the weft thread sensor away from the reed towards the fell of the cloth and locating the control arm in a first position;

b. the control means comprises a push button switch and a switch lever operatively associated with it;

c. in the presence of the last introduced weft thread the weft thread sensor upon the beating-up motion of the reed is pressed against said weft thread and thereby swung back towards the reed, whereby the control means is brought into a second position before contacting the switch lever; and

d. in the absence of the last introduced weft thread the weft thread sensor remains in the position swung away from the reed until the end of the beating-up motion of the reed, whereby the control arm is brought from the first into the second position and thereby actuates the switch lever of the control means when the weft thread sensor strikes against the fell of the cloth.

4,009,738

APPARATUS FOR CUTTING AN INSULATED WIRE, STRIPPING THE END THEREOF AND TWISTING THE WIRE STRANDS

Tsutomu Baba, Kawanishi, and Shinpei Inukai, Takarazuka, both of Japan, assignors to Shin Meiwa Industry Co., Ltd., Nishinomiya, Japan

Filed Oct. 15, 1975, Ser. No. 622,639

Claims priority, application Japan, Oct. 25, 1974, 49-123762

Int. Cl.² B21F *7/00*; H02G *1/12*

U.S. Cl. 140—149 **5 Claims**

1. An apparatus for cutting an insulated wire, stripping the end thereof and twisting the wire strands, comprising;

means for intermittently supplying said insulated wire,

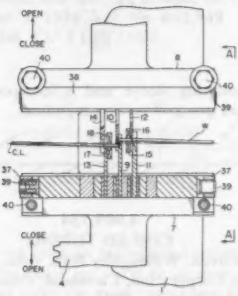
wire cutting means adapted to be driven toward said supplied wire to cut the same at a predetermined position during the stoppage of supplying operation of said wire supplying means,

front and rear insulation cutting means adapted to be driven toward said wire to cut substantially only the insulation of said wire at positions spaced apart from said predetermined cutting position of said wire cutting means,

said front and rear insulation cutting means being located away from each other with respect to the axis of said supplied wire, whereby the end portions of the wire at the opposite sides of said wire cutting means are placed in spaced relation with each other, when said wire cutting means and said front and rear insulation cutting means have been driven toward said supplied wire,

said wire cutting means having recesses formed on the surfaces thereof at the area around the position where the tip ends of said wire at the opposite sides of said wire cutting means abut against said surfaces of said wire cutting means, when said wire cutting means and said front and rear insulation cutting means have been driven toward said supplied wire,

front and rear insulation rotating means adapted to be



driven during the stoppage of the supplying operation of said wire supplying means, said front insulation rotating means being located between said front insulation cutting means and said wire cutting means, said rear insulation rotating means being located between said rear insulation cutting means and said wire cutting means for rotating the insulation of said end portions of the cut wire at the opposite sides of said wire cutting means about the axis of said wire,

means for drawing said wires disposed forwardly and rearwardly of said wire cutting means in the directions away from said wire cutting means while said insulation rotating means are rotating the insulation of said end portions of the cut wire at the opposite sides of said cutting means, whereby the insulation of said end portions of the wire at the opposite sides of said wire cutting means is stripped from said wire, while the portion of the wire strands stripped of the insulation is twisted by the rotation of said portions of insulation being stripped, with the tips ends of the wire facing said recesses of said wire cutting means.

4,009,739

GASOLINE AND VAPOR RETURN HOSE SYSTEM FOR DELIVERY TRUCK

Danny J. Weatherford, 7250 N. 41st Ave., Phoenix, Ariz. 85021

Filed Sept. 2, 1975, Ser. No. 609,282

Int. Cl.² B65B *39/04*

U.S. Cl. 141—59 **4 Claims**

1. A volatilizable liquid fuel and vapor return hose system for delivery trucks comprising:

a flexible hose having coaxially arranged fluid conducting passageways extending along substantially its full length,

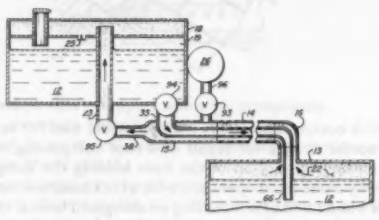
the inner one of said passageways provided for carrying a volatilizable liquid fuel and the outer one of said passageways carrying vapors of said fuel,

a first hose coupler for one end of said hose,

a second hose coupler for the other end of said hose,

said first coupler comprising a transition section connectable to a fuel delivery port of the truck for connecting said inner one of said passageways to the truck's liquid fuel compartment and said outer one of said passageways to a vapor return tube of the truck connectable to said liquid fuel compartment of the truck,

said second coupler comprising a storage tank entry adaptor having an entry tube for extending a predetermined distance into the storage tank and connectable to said inner one of said passageways and a vapor exhaust opening coaxially arranged adjacent said entry tube and connectable to said outer one of said passageways for exhausting vapors from said storage tank as it fills with liquid,



and a pair of detachable clamping members one mounted at each end of said hose for engaging with said first coupler at one end of the hose for connecting said one of said passageways to the liquid fuel compartment of the truck and the other passageway to the vapor return tube of the truck, and the other end of said hose to said second coupler for connecting said entry tube to said one of said passageways and said vapor exhaust opening to the other of said pasageways, and

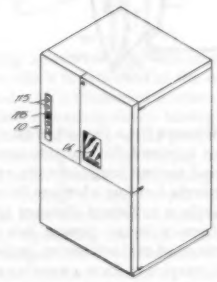
means for connecting a source of air under pressure to said inner one of said passageways for clearing the passageway of fuel before disconnecting said clamping members from said first and second couplers after a fuel delivery procedure.

4,009,740

ICE CREAM DISPENSING MACHINE

Joseph Frank Michielli, 11324 E. 36th Ave., Spokane, Wash. 99206

Filed Sept. 26, 1975, Ser. No. 617,096
Int. Cl.² B65B *43/60*
U.S. Cl. 141—172 **11 Claims**



1. In an automatic ice cream dispensing machine a combination comprising:

a supporting framework;

ice cream dispensing means on the framework at an ice cream container filling station for successively dispensing ice cream into ice cream containers;

refrigeration means for cooling the ice cream within the dispensing means;

a container magazine on the framework at an empty container dispensing station for receiving an upright nested stack of upwardly open empty ice cream containers and for guiding the stack to move gravitationally downward through a magazine opening;

carriage means on the framework sequentially movable horizontally between the empty container dispensing station and the container filling station and filled ice cream discharge station intermediate the empty container dispensing station and the container filling station;

an escapement means adjacent the magazine opening at the empty containers dispensing station for alternately (a) closing to support the stack and thereby prevent downward movement of the stack through the magazine opening and (b) opening to release the full stack to fall by gravity with the bottom container of the stack falling below the escapement means; and

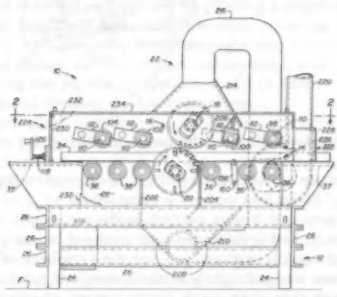
a container receiving means supported on the carriage and mounted for sequentially (a) moving upward when the carriage is at the empty container station to a first position immediately below the magazine opening to receive the bottom container of the stack when the escapement means is open, (b) supporting the full stack prior to the closing of the escapement means, (c) moving downward after the escapement means is closed to thereby remove the bottom container from the stack, (d) carrying the bottom container on the carriage from the empty container dispensing station to the container filling station, (e) moving this container upward at the container filling station to the ice cream dispensing means, (f) moving the container slowly downward as it is being filled, and (g) carrying the filled container to the container discharge station.

4,009,741

WOODWORKING MACHINE

Edwin H. Zimmerman, New Holland, Pa., assignor to E.Z. Mfg. Co., New Holland, Pa.

Filed Mar. 23, 1976, Ser. No. 669,687
Int. Cl.² B27C *9/04*
U.S. Cl. 144—41 **7 Claims**



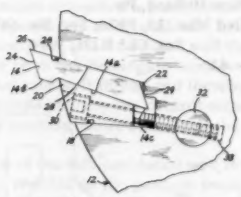
1. A woodworking machine for sawing a stock beam or plank of wood into a plurality of side-by-side board strips and simultaneously shaping the opposite edges of said board strips as they are sawed to form finished strips of desired cross-sectional shapes, said machine comprising in combination;

a. a frame having a substantially horizontal linear feed path for stock material,

b. a pair of parallel horizontal arbors supported in cantilever manner by said frame transversely to said path and respectively spaced above and below said path and linearly offset from each other relative to said path and the outer ends thereof being threaded and provided with clamping nuts,

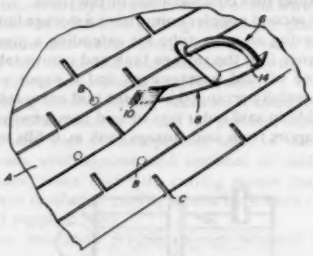
c. a clamping collar fixedly positioned on each arbor precisely within a common vertical plane,
d. feeding and tensioning rollers frictionally engaging opposite surfaces of said stock beam or plank to positively feed the same along said path,
e. a plurality of pairs of similar rotary saws mounted upon said arbors, respectively in common parallel vertical planes and spaced transversely apart predetermined axial distances corresponding respectively to the thicknesses of board strips to be formed by said machine, the summation of the radii of each pair of said saws being at least equal to the vertical distance between the axes of said arbors and the linear offset of said arbors permitting operations of each pair of saws without interference with each other,
f. pairs of cooperating shaping cutters of less radii than said saws respectively mounted upon said arbors between said saws and operable simultaneously with the rotation of said saws to form desired finished edge contours upon both edges of all of said board strips as sawed by said saws and said clamping nuts on said arbors firmly clamping said saws and shaping cutters in accurate operative relationship with each other, and
g. power means connected to said arbors and feed means to drive the same in operative directions to feed said stock beam or plank along said path and saw the same into a desired number of board strips while simultaneously shaping and finishing the opposite edges thereof.

4,009,742
WOOD-WORKING MECHANISM
Harold R. Ziegelmeyer, 5010 Griffin Creek Road, Medford, Oreg. 97501
Filed Nov. 28, 1975, Ser. No. 635,906
Int. Cl.² B27G *13/04*
U.S. Cl. 144—230 **7 Claims**



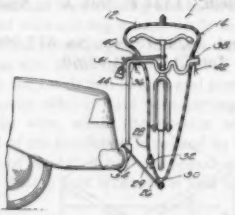
1. Wood-working mechanism comprising the combination of
a. a blade carrying cutter wheel having a plurality of peripheral blade and wedge carrying slots,
b. a series of blades carried in the respective slots of the wheel, and constructed and arranged to protrude fixedly and equally outward beyond the periphery of the wheel, when wedged tightly in their assigned positions in their respective slots, each blade having parallel inner and outer surfaces at its opposite ends which slope equally outward and forward, a flat forward surface, and a rear surface which includes a wedgable portion through which the blade may be urged forward,
c. a wedge member associated with each blade in its wheel slot constructed and arranged to force the blade forward to a definite, assigned limit of forward movement relative to the wheel,
d. means in each slot for engaging the inner surface of the blade to force it outward as an incident of its being forced forward, and
e. means for individually forcing each wedge member inward to an inner limit of movement determined by the thickness of the blade, and positively retaining it there.

4,009,743
ROOFING TOOL
Leonard D. Ackerman, Box 113, Conyngham, Pa. 18219
Filed Feb. 24, 1976, Ser. No. 661,008
Int. Cl.² B66F *15/00*
U.S. Cl. 145—1 A **10 Claims**



1. A compact manually manipulatable tool for removing a particular shingle for repair of a roof comprising; means for permitting the pry-up of the nails holding the shingle to the roof by a one hand operation with a rocker action swing of the user's hand and arm including an elongated bowed rocker bed having a concave surface extending the length thereof and a forward prying end which is adapted to be inserted under the free edge of a shingle to dislodge the nails holding it, said rocker bed having a rearward levered end, and a short handle rigidly attached to and extending upwardly from the concave surface of said levered end, whereby said tool may be worked solely with one hand.

4,009,744
BICYCLE BAG
John A. Joslyn, 2441 N. 111th St., Wauwatosa, Wis. 53213
Filed Oct. 1, 1975, Ser. No. 618,591
Int. Cl.² B60R *9/10*
U.S. Cl. 150—52 R **2 Claims**

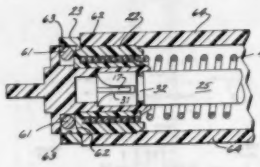


1. A protective enclosure for a two-wheeled cycle comprising a bag having two opposed flexible side panels, said side panels having first and second longitudinally extending margins, with said first margin forming a bottom for said enclosure and extending upwardly a sufficient distance to overlap said second margin to form a linear closure line between said panels above the bottom of said enclosure, means for detachably connecting said margins to form a weather seal along said closure line and wherein said side panels have two sets of oppositely located openings adapted to receive bicycle supporting members of a bicycle rack on a vehicle, said openings being defined by generally tubular sleeve portions formed in said side panels and extending outwardly therefrom and means to tighten said sleeves to provide a weather seal about said openings.

4,009,745
WINDOW SHADE SUPPORT ROLLER AND METHOD OF ASSEMBLING

Paul J. Erpenbeck, Muskegon, Mich., assignor to Breneman, Inc., Cincinnati, Ohio

Filed May 2, 1975, Ser. No. 573,985
Int. Cl.² E06B 9/208
U.S. Cl. 160—297 13 Claims

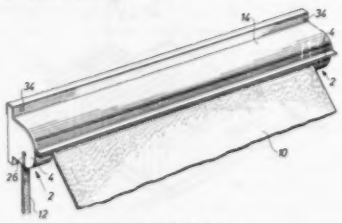


1. A window shade support assembly comprising:
a spear structure having means for engaging an external support bracket and means for forming a portion of a window shade clutch;
a spring-retaining structure having means for cooperatively engaging the spear structure, means for forming another portion of a window shade clutch, and means for positively retaining a drive spring; and
means acting in cooperation with said clutch portions of the spear structure and the spring retaining structure for providing a window shade roller clutching mechanism;
and radially-projecting portions extending laterally from at least one of said spear structure or said spring-retaining structure and interfitting with the other such structure to maintain the two structures assembled together.

4,009,746
AWNING SYSTEM OR THE LIKE

Finn Otterbeck, Gravdalsvejen 12, Oslo 7, Norway

Filed Nov. 24, 1975, Ser. No. 634,656
Int. Cl.² E06B 9/24
U.S. Cl. 160—323 R 5 Claims

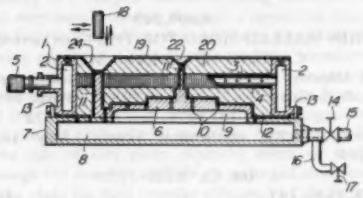


1. An awning system or the like comprisng a screening material piece which is provided at the edge connected with the winding rod with a thickened portion, a winding rod having a longitudinal extending cavity having a narrow portion at the surface of the rod and a wider portion inside the narrow portion, the screening material having its thickened portion received in the wider portion of the cavity and extending away from the cavity through the narrow portion thereof, the cavity being open at at least one end of the rod, and bearing arrangements rotatably supporting the ends of the rod, at least one of the bearing arrangements being formed with a passage having at least the same sectional size as the thickened edge portion of the screening material and being so related to the open end of the cavity that the rod is rotatable to a position in which the thickened edge portion of the screening material piece is in the longitudinal direction of the rod removable from and introducable into the cavity through said passage in order to disconnect the screening material from and connect the material with the rod, respectively.

4,009,747
METHOD OF AND DEVICE FOR FORMING VACUUM SEALED MOLDS

Takashi Miura; Hideto Terada; Takao Inoue, and Hironobu Kubota, all of Toyokawa, Japan, assignors to Sintokogio, Ltd., Nagoya, Japan

Filed Mar. 12, 1975, Ser. No. 557,452
Claims priority, application Japan, Mar. 16, 1974, 49-30216; Apr. 25, 1974, 49-47029
Int. Cl.² B22C 5/12
U.S. Cl. 164—7 11 Claims



1. A method of forming vacuum sealed molds comprising the steps of
a. applying a first film over the surface of a pattern plate including a pattern for forming a mold cavity and at least one rod member integral therewith for forming a sprue or a communicating passage;
b. assembling said pattern plate with a molding flask provided with means for reducing the pressure therein;
c. charging a particulate material into the flask;
d. forming a cup-shaped pouring basin in said charged material by removing part of the charged material immediately above the rod member by vacuum suction until the top of said rod member covered with the film is exposed to form said cup-shaped pouring basin in the particulate material;
e. applying a shielding film over said flask and the upper surface of the charged material whereby said material covers said cup-shaped pouring basin;
f. forcing said first film and the shielding film into intimate contact with the lower and the upper surfaces of the charged material respectively by creating a negative pressure in the flask with said pressure reducing means whereby said shielding film is brought into contact with the first film at the top of said rod member; and
g. removing the pattern plate from said first film.

10. In a mold forming device comprising:
a. a pattern plate including a pattern with at least one rod member for forming a sprue or communicating passage;
b. a molding flask mounted on said pattern plate; and
c. particulate material charged into an open topped chamber defined by said pattern plate and said molding flask;
the improvement comprising:
d. sucking means positioned above the upper surface of the charged material for removing the particulate material adjacent the free end of said rod member to form a cup-shaped pouring basin in the charged material above the free end of said rod member.

4,009,748
METHOD OF STARTING CONTINUOUS CASTING

Heinrich Keddeinis, Lintorf, and Klaus Wünnenberg, Duisburg, both of Germany, assignors to Mannesmann Aktiengesellschaft, Dusseldorf, Germany

Filed Jan. 30, 1975, Ser. No. 545,416
Claims priority, application Germany, Feb. 14, 1974, 2407435
Int. Cl.² B22D 11/08
U.S. Cl. 164—73 7 Claims

1. Method of starting continuous casting using a mold with

a wall and from which an ingot is withdrawn from the bottom as molten metal is poured into the top of the mold, comprising the steps of lining the interior wall surface of the mold with glass;

using an adhesive to hold the lining on the inner surface of the mold prior to the beginning of casting;

pouring metal into the mold for continuous casting, whereby the glass lining melts to form a lubricating flux layer;

and

replenishing the flux layer by casting powder.

4,009,749

THIN-WALLED MOLD FOR THE CONTINUOUS CASTING OF MOLTEN METAL

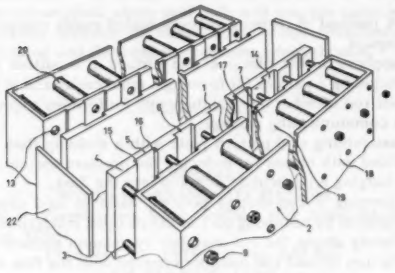
Robert Alberny, Metz, France, assignor to Institut de Recherches de la Siderurgie Francaise (IRSID), Paris, France

Filed May 14, 1976, Ser. No. 686,522

Claims priority, application France, May 16, 1975, 75.15299

Int. Cl.² B22D *11/04*

U.S. Cl. 164—147 **10 Claims**



1. A thin-walled mold for the continuous casting of molten metal, comprising

1. an inner mold element consisting of copper or a copper alloy, the inner mold element having

a. interior faces defining therebetween a passage for the cast metal and

b. exterior faces having parallel longitudinally extending ribs defining grooves therebetween;

2. an outer envelope consisting of steel, the outer envelope being spaced from and surrounding the inner mold element, the outer envelope having

a. interior faces having parallel longitudinally extending ribs facing the grooves in the exterior faces of the inner mold element, the facing ribs and grooves defining therebetween longitudinal channels for a cooling liquid for the mold; and

3. for affixing the envelope to the mold element, the means being anchored to the ribs in the exterior faces of the inner mold element.

4,009,750

APPARATUS FOR CONTROLLING THE COOLING OF A STRAND EMANATING FROM A CONTINUOUS CASTING MOLD

Kalman Fekete, Stafa, and Werner Bruderer, Wattwil, both of Switzerland, assignors to Concast AG, Zurich, Switzerland

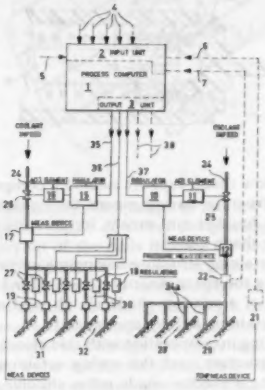
Division of Ser. No. 393,556, Aug. 31, 1973, Pat. No. 3,915,216. This application July 24, 1975, Ser. No. 598,641

Claims priority, application Switzerland, Sept. 6, 1972, 13120/72

Int. Cl.² B22D *11/16*

U.S. Cl. 164—154 **3 Claims**

1. An apparatus for controlling the secondary cooling of a continuously cast strand departing from a continuous casting mold of a continuous casting installation, comprising computer means, a cooling device arranged downstream of the casting mold and forming a total secondary cooling zone for secondary cooling of the continuously cast strand, said cooling device being divided into at least two sections, each of the sections of the cooling device being further subdivided into sub-groups, cooling agent delivery means for delivering cooling agent to the cooling device, means cooperating with said cooling device sections for applying cooling agent to the strand, means for controlling the quantity of cooling agent



delivered to each of the cooling device sections and each of the sub-groups, said controlling means incorporating individual regulator means connected to each of said cooling device sections and to each of said sub-groups for regulating the quantity of cooling agent supplied to said sections and sub-groups to maintain constant the residence time of the cast strand in the total secondary cooling zone, said respective regulator means further being individually and directly connected to and controlled by said computer means and input means connected to said computer means for introducing cooling control data inputs to said computer means.

4,009,751

METHOD OF AND APPARATUS FOR HIGH INTENSITY HEAT AND/OR MASS TRANSFER BETWEEN TWO OR MORE PHASES

Andrej Zelnik, Bratislava, Czechoslovakia, assignor to Slovenska vysoka skola technika, Bratislava, Czechoslovakia

Filed Nov. 7, 1974, Ser. No. 521,862

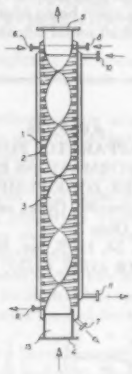
Claims priority, application Czechoslovakia, Nov. 9, 1973, 7681/73

Int. Cl.² F28F *1/14*

U.S. Cl. 165—1 **2 Claims**

1. In a method of heat and/or mass transfer between first and second fluid phases wherein the first phase has a specific gravity greater than the second phase and wherein the method comprises the steps of separately flowing the first and second phases along an elongated cylindrical column in heat and/or mass transfer relation, the improvement which comprises the steps of directing the flow of the first phase downwardly through the column along an essentially continuous helical path throughout the entire length of the column adjacent the

inner wall thereof, and directing the flow of the second phase along an essentially continuous helical path through the interior of the column in direct physical contact with the helical downward flow of the first phase.

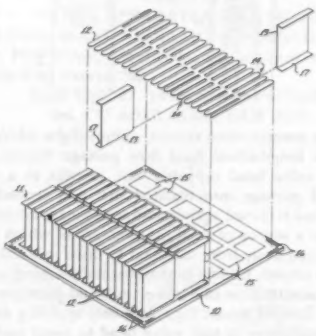


4,009,752

WARP-RESISTANT HEAT SINK

Edward Arthur Wilson, Phoenix, Ariz., assignor to Honeywell Information Systems Inc., Phoenix, Ariz.

Filed Feb. 24, 1975, Ser. No. 552,494
Int. Cl.² H01L *23/36*
U.S. Cl. 165—81 **4 Claims**



1. A warp-resistant heat sink suitable for soldering to a relatively fragile, ceramic semiconductor substrate, wherein said heat sink comprises

a rectangular heat-conducting plate having a plurality of slit-like openings along opposite edges thereof, said openings being normal to the edges, the openings along one edge being offset with respect to those along the opposite edge, said plate having a thermal coefficient of expansion substantially identical to that of said ceramic substrate;

a plurality of U-shaped heat-conducting members, each of said members extending through a respective one of said openings in said plate, the members which extend through the openings along one edge of said plate all having an identical orientation and the members which extend through the openings along the opposite edge of said plate all having an identical orientation, the orientation of the members along one side being different from that of the members along the opposite side, one side of each of said members being secured to the same side of said plate, said members being formed of material having a different thermal coefficient of expansion than said plate, whereby when said heat sink plate is soldered to said substrate the laminate thereby formed comprises two outer layers of material having substantially identical thermal coefficients of expansion and an inner layer having a different theremal coefficient of expansion.

3. An air-cooled heat sink, comprising

a rectangular plate having a plurality of slit-like openings along opposite edges thereof, said openings being normal to the edges, the openings along one edge being offset with respect to those along the opposite edge;

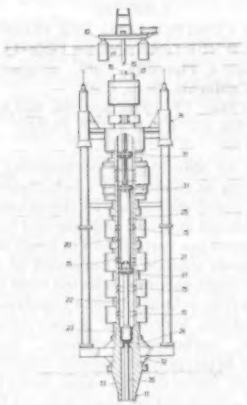
a plurality of U-shaped heat-conducting members, each of said members extending through a respective one of said openings in said plate, the members along one edge all having an identical orientation and the members along the opposite edge all having an identical orientation, the orientation of the members along one edge being different from that of the members along the opposite edge, one side of each of said members being secured to the same side of said plate, whereby when air is directed through the members which are arranged along one edge of the plate the heat transfer efficiency of the heat sink is substantially increased as a result of inhibiting the formation of a thermal boundary layer along the members which are arranged along the opposite edge of the plate.

4,009,753

SUBSEA MASTER VALVE APPARATUS

Howard L. McGill, Houston; Ervin Randermann, Jr., Beasley, and Olgierd J. Musik, Houston, all of Tex., assignors to Schlumberger Technology Corporation, New York, N.Y.

Filed Mar. 22, 1976, Ser. No. 669,128
Int. Cl.² E21B *29/00*
U.S. Cl. 166—55.1 **16 Claims**



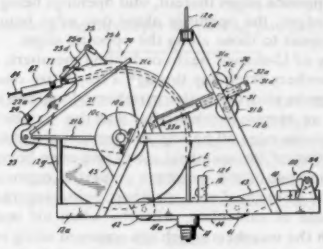
1. Valve apparatus comprising: a tubular valve body having an axially extending flow passage; spherical annular seat means surrounding said flow passage; a ball element in said valve body and having a throughbore aligned with said flow passage in the open position and an outer spherical surface engageable with said seat means in the closed position; and means for rotating said ball element between open and closed position; said ball element having cutting means cooperable with said seat means for cutting in two a tubular member extending through said bore, and relief means for preventing a tubular member from being placed in double shear during cutting thereof by said cutting means.

4,009,754

ELECTRICAL CABLE FEEDING AND REMOVING APPARATUS

Roy H. Cullen; Joshua M. Jackson, and Jim Witovek, Jr., all of Houston, Tex., assignors to General Electric Company

Filed Oct. 9, 1975, Ser. No. 621,157
Int. Cl.² E21B *19/08*; **B65H** *49/00*
U.S. Cl. 166—77 **12 Claims**



1. An apparatus for feeding and removing one or more sections of an electrical cable having substantially rigid terminal electrical connectors at the ends of each cable conductor section, said apparatus comprising:

a sheave assembly for receiving the electrical cable for feeding and removing the fixed length of electrical cable; and

means for engaging the electrical cable sections for supporting one of the terminal connectors of each cable section for arcuate movement relative to the sheave assembly in response to movement of a connector with the cable being fed or removed to prevent excessive bending of the supported connector and the electrical cable conductor at an interface between the conductor and the supported connector.

4,009,755

SELECTIVELY CONTROLLING THE FLOW OF FLUIDS THROUGH SUBTERRANEAN FORMATIONS

Burton B. Sandiford, Placentia, Calif., assignor to Union Oil Company of California, Brea, Calif.

Filed Mar. 17, 1976, Ser. No. 667,694
Int. Cl.² E21B *43/22*, *33/138*
U.S. Cl. 166—270 **34 Claims**

1. A method for reducing the permeability of the higher permeability strata or channels of a heterogeneous subterranean formation penetrated by a well comprising:

a. injecting through said well and into said formation about 5 to 200 barrels per vertical foot of strata to be treated of (1) an aqueous solution or dispersion of relatively high molecular weight polymers selected from the group consisting of acrylic acid-acrylamide copolymers, polyacrylamides, partially hydrolyzed polyacrylamides, polyalkyleneoxides, carboxyalkylcelluloses, hydroxyethylcelluloses and heteropolysaccharides obtained by the fermentation of starch-derived sugar, and (2) an aqueous solution of a cross-linking agent selected from the group consisting of mixtures of a compound of a multivalent metal and a reducing agent, a low molecular weight water-soluble aldehyde, and a colloidal hydroxide of a polyvalent cation, said aqueous solution of said cross-linking agent being injected preceding or following said aqueous solution or dispersion of high molecular weight polymer, or said aqueous solution of said cross-linking agent being admixed with said aqueous solution or dispersion of said high molecular weight polymer; and

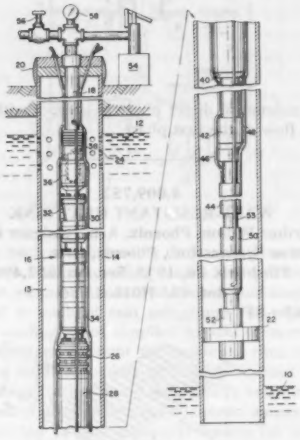
b. thereafter injecting from about 1 to 10 barrels per vertical foot of strata to be treated of (1) an aqueous solution of an alkali metal silicate and (2) an aqueous solution of a gelling agent selected from the group consisting of acid and acid-forming compounds, water-soluble ammonium salts, lower aldehydes, aluminum salts and alkali metal aluminates, said aqueous solution of said gelling agent being injected preceding or following said aqueous solution or said gelling agent being admixed with said aqueous solution of said alkali metal silicate.

4,009,756

METHOD AND APPARATUS FOR FLOODING OF OIL-BEARING FORMATIONS BY DOWNWARD INTER-ZONE PUMPING

James N. Zehren, Bartlesville, Okla., assignor to TRW, Incorporated, Cleveland, Ohio

Filed Sept. 24, 1975, Ser. No. 616,319
Int. Cl.² E21B *43/00*, *43/20*; **F16K** *17/06*
U.S. Cl. 166—250 **21 Claims**



14. A flow control valve system comprising a tubular housing having a longitudinal fluid flow passage therein, means including a valve head movable with respect to a seat for dividing said passage into isolated first and second spaces when said head is closed against said seat, means coupling said first space to a source of fluid the pressure of which tends to move said head away from said seat to open said valve when said valve is closed, biasing means normally urging said head against said seat to close said valve, and fluid-pressure-responsive remote control means for selectively applying an adjustable additional force to said valve head to assist said biasing means to close said valve or, upon reduction of said force, to permit said head to move away from said seat in response to the pressure of fluid from said source, whereby said fluid may flow from said first space to said second space.

19. A method of flooding an underground formation with a fluid through a bore hole, which comprises dividing said bore hole into first and second regions, the latter communicating with said formation, providing a submergible pump at said first region which discharges through a valve to said second region, supplying fluid from said first region to said pump, operating said pump, initially blocking the discharge of fluid from said pump to said second region during start-up of said pump by applying a force to said valve to hold it closed, thereafter reducing said force and opening said valve, thereby permitting fluid to flow from said pump to said second region, adjustably controlling said valve independently of the pump to maintain flooding of said formation, terminating the operation of said pump, and thereupon automatically closing said valve, thereby blocking reverse flow from said second region to said pump.

4,009,757
SAND CONSOLIDATION METHOD

Roy R. Vann, Box 38, Artesia, N. Mex. 88210

Filed Feb. 3, 1975, Ser. No. 546,802
Int. Cl.² E21B *43/116, 43/26*
U.S. Cl. 166—276 **10 Claims**

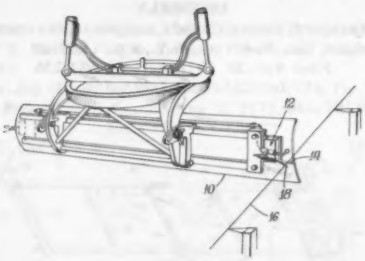
1. Method of completing an unconsolidated production formation which is located downhole in a borehole comprising the steps of:

1. suspending a perforating gun adjacent to the formation by connecting the gun to a tubing string and running the tubing string downhole;
2. locating a foamable agent in the tubing string downhold adjacent to the gun; said agent initially being in a fluid state and having properties which cause it to undergo chemical reaction over an interval of time to form a self-supporting porous mass;
3. forming a flow path which extends from the interior of the tubing string, through at least part of the gun, and into the borehole annulus located between the borehole wall and the gun;
4. communicating the borehole with the formation by perforating the borehole wall with the gun;
5. forcing said agent to flow from the tubing string and into the formation by increasing the pressure on said agent to a value which exceeds the formation pressure, while the agent is in a fluid state;
6. holding the pressure on said agent at a value which is at least equal to the formation pressure until an inverval of time expires during which the agent undergoes chemical reaction and becomes a self-supporting porous mass;
7. reducing the pressure of step (6) so that formation fluid flows through the self-supporting porous mass and into the production tubing.

4,009,758
BLADE CONTROL APPARATUS OF A MOTOR GRADER INCLUDING WAND VIBRATION DAMPING ELEMENT

William R. Tillman, Monticello, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Sept. 22, 1975, Ser. No. 615,653
Int. Cl.² A01B *65/06;* **E02F** *3/76*
U.S. Cl. 172—4.5 **5 Claims**



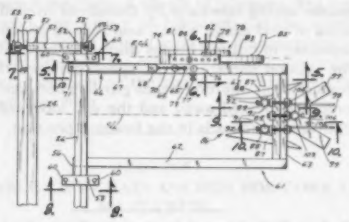
1. In control apparatus of a blade of a motor grader having a wand extending outwardly from associated controls for contact with a reference line for causing the blade to follow a pathway substantially parallel to the reference line in response to vertical movement of the wand as the wand passes along the reference line, said wand having a first end portion for contacting the reference line connected to the associated controls, the improvement comprising:

biasing means including a flexible means having a substantially smaller cross-section than said wand and flexibly associated therewith for contacting the reference line and urging said reference line toward the first end portion of the wand at a preselected force said biasing means and said wand exerting reaction forces therebetween upon impact forces being subjected upon at least one of said wand and said biasing means while said reference line is therebetween for damping vibrations of the wand while permitting said reference line to move to positions spaced from the wand during said vibrations with said reference line being sufficiently maintained relative to said flexible means to provide a desirable magnitude of vibration damping upon said wand.

4,009,759
CULTIVATOR APPARATUS

Arnold E. Ernst, Wolverton, Minn. 56594

Filed Mar. 26, 1975, Ser. No. 562,016
Int. Cl.² A01B *63/16, 63/26, 37/00, 49/02*
U.S. Cl. 172—395 **5 Claims**



1. A cultivating apparatus for row crops for use with a tractor having a three point hitch arrangement, a draw bar adapted to be connected to the three point hitch arrangement whereby the draw bar is movable by tractor operation of the three point hitch arrangement between a ground working position and a transport position, and a tool bar secured to the draw bar in parallel relation and behind the draw bar relative to the tractor, said apparatus comprising:

cultivating means pivotally connected at one end to the tool bar and extending rearwardly of the tool bar, said cultivating means including a plurality of individual cultivator units each pivotally attached to the tool bar, each of said cultivator units being independently pivotally movable about the tool bar;

each cultivator unit including a frame member, a disk unit and a first sweep means, said frame member having one end pivotally affixed to the tool bar and having a free end, said disk unit being mounted on said free end, said disk unit including a pair of laterally disposed rotatably mounted disks, said disks being adjacent to a row of crops, one each of said disks being disposed on opposite sides of the row of crops when said cultivating means is in the ground working position, said first sweep means being mounted on said free end between said disks and immediately rearward of said disks;

means for supporting said cultivating means upon the ground, said means for supporting including a plurality of gauge wheels, each cultivator unit intermediate its ends having one of said gauge wheels affixed thereto;

means for independently adjusting the vertical and horizontal position of each of said gauge wheels with respect to each respective frame member including a plurality of substantially vertically aligned openings disposed in each respective frame member, an internally threaded horizontally aligned opening disposed in each of said frame members intersecting with each of said vertically aligned openings, a shaft disposed in one of said vertically aligned openings of each of said frame members and selectively receivable in at least one other of the other vertically aligned openings of the frame members for allowing horizontal adjustment, said gauge wheels being rotatably mounted to the bottom of each of said shafts;

threaded set screw means for reception in the horizontally aligned openings for selectively positioning each of the shafts vertically with respect to the frame member and thereby selectively positioning the gauge wheel with respect to said frame; and

wherein said first sweep means and said disk unit are aligned along the longitudinal center line of said cultivator unit, said frame member including side members and a transverse member, said side members being at one end thereof pivotally attached to the tool bar and at the opposite end thereof joined by said transverse member, said disk unit and said first sweep means being mounted on said transverse member, the radial center line of said gauge wheel being parallel to and offset from said longitudinal center line whereby such nonalignment of said gauge wheel with respect to said cultivator unit provides lateral support to said cultivator unit, each of said cultivator units having a second sweep means for cutting attached to said frame member intermediate its ends and directly above said gauge wheel, said second sweep means arcing downwardly therefrom immediately rearward of said gauge wheel, said second sweep means terminating in cutting blades disposed above and adjacent the ground surface in the space between the adjacent rows of crop whereby weeds growing between the rows of crop are cleared away and the soil loosened when said cultivating means is in the lowered position.

4,009,760

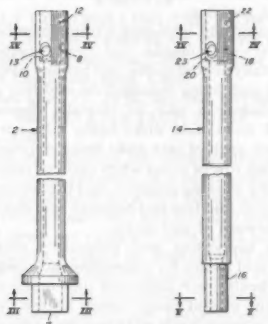
APPARATUS FOR ROOF DRILLING

Lloyd B. Hansen, Bridgeport, and Eugene R. Smarrella, Shinnston, both of W. Va., assignors to Carmet Company, Pittsburgh, Pa.

Continuation of Ser. No. 554,878, March 3, 1975, abandoned. This application May 6, 1976, Ser. No. 683,986

Int. Cl.[2] E21B *17/00, 17/04;* **E21C** *15/00*

U.S. Cl. 175—320 **3 Claims**



1. A roof drilling assembly comprising a starter-driver bar including a first end adapted to be driven by a motor and a second end having a female socket therein, a rod extension having a male end shaped to be received in said female socket and a female socket at its other end of the same cross-sectional size and shape as the first named female socket, and a bit having a male shank of the same cross-sectional shape as said male end, said sockets, male end and shank being non-circular in transverse cross-section, the bottom of each of said female sockets having a shoulder at its inner end, each of said starter-driver bar and rod extension having an axial hole therethrough, and each socket having a transverse hole through its wall spaced from said shoulder, said bit shank being so received in said female socket of said driver bar or rod extension that the axial hole therein communicates with the corresponding transverse hole and the length of said male end received in said socket being such that it covers said transverse hole.

4,009,761

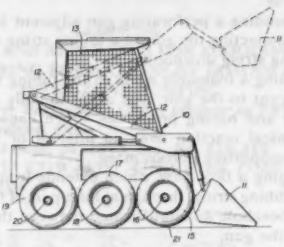
SKID STEER VEHICLE

Gustave Meyer, Northglenn, Colo., assignor to Irvin L. Stumpf, Wheat Ridge, Colo., a part interest

Filed May 2, 1975, Ser. No. 573,867

Int. Cl.[2] B62D *11/02*

U.S. Cl. 180—6.2 **1 Claim**



1. A skid steer loader having loader arms pivotally connected near the rear of the vehicle for operating a mechanism at the front of the vehicle, comprising

a. a vehicle body, and

b. three transversely extending axles being a front, a center, and a rear axle supporting said vehicle body and having a plurality of wheels arranged in pairs thereon, each wheel being near but not contacting an adjacent wheel, the front and rear axles being in a single horizontal plane that would levelly support the vehicle body, and the center axle being in a lower horizontal plane than the plane of the front and rear axles, variations in the vehicle load forwardly and rearwardly of the center axle automatically producing rocking movement of the vehicle and four wheel traction utilizing either the combination of wheels on the center and front axles or the combination of wheels on the center and rear axles bearing on a supporting surface.

4,009,762

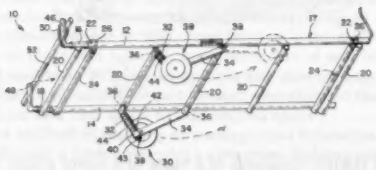
CONVERTIBLE LADDER-CARRIER VEHICLE ASSEMBLY

Bjorn Bjerkgard, Surrey, Canada, assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Apr. 28, 1976, Ser. No. 681,236

Int. Cl.[2] E06C *1/397, 5/00*

U.S. Cl. 182—20 **8 Claims**



1. A convertible ladder-carrier vehicle assembly comprising in combination:

a first pair of elongated parallel hollow metal tubing members having at least one set of opposed aligned apertures therein;

at least four transverse elongated metal elements connected in spaced parallel relation across said first pair of elongated members to thereby maintain said first pair of members in fixed spatial relation;

a second pair of elongated elements positioned slidably within said first pair of elongated members and having at least one set of opposed aligned apertures therein;

at least one transversely extending resilient attaching mem-

ber having a hook element at each end thereof dimensioned to fit within said sets of apertures to thereby secure said second pair of elongated elements in fixed position relative to said first pair of elongated members;

and a pair of wheel assemblies detachably journalled in the opposed ends of intermediate ones of said transverse elongated elements.

4,009,763

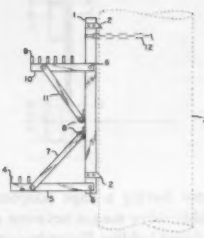
POLE LADDER

Alex E. Hunter, 924 Chartiers Ave., Pittsburgh, Pa. 15220

Filed Dec. 3, 1975, Ser. No. 637,374

Int. Cl.² A47C *9/10*

U.S. Cl. 182—187 **2 Claims**



1. A ladder assembly for suspension from a pole or similar structure, comprising a channel having side flanges, a pair of cleats, each connected to one of said side flanges for piercing said pole, a ladder pivotally mounted in a collapsible manner on said side flanges, said ladder comprising a pair of collapsible steps of different width, the lower one being greater, each comprising a platform supported by a pair of braces interconnected by a rod at their extremities, a pair of hooks secured to spaced points along said channel for receiving said rods when the ladder is in operating position, and a chain tightening means swivelly mounted on one of said flanges and automatically adjustable in direction to the circumference of the pole for tightly embracing the pole and piercing it with said cleats.

4,009,764

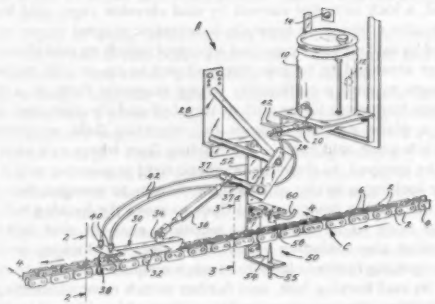
LUBRICATING APPARATUS FOR CONVEYOR CHAINS

Henry F. Hafner, 9030 Saranac, Richmond Heights, Mo. 63117

Division of Ser. No. 472,299, May 22, 1974, Pat. No. 3,903,994. This application Aug. 7, 1975, Ser. No. 602,774

Int. Cl.² F16N *13/22*

U.S. Cl. 184—15 A **10 Claims**



1. In a chain system including a moving chain having links arranged in two distinct spaced apart rows which are parallel and extend longitudinally of the chain, and cross pieces extending transversely of the chain and connecting successive links in the rows, all of the cross pieces being parallel and each of the rows being continuous so that no gaps exist between adjacent links of the rows, the chain having a tendency to move laterally as it moves in the normal longitudinal direction of chain advancement; an improved chain lubricating apparatus comprising: an anchor past which the chain moves; a chain follower bearing against the cross pieces on the chain and confined in the lateral direction by the links so that when the chain moves laterally the follower moves laterally with it; restraining means connecting the follower with the anchor for restraining the follower and thereby preventing it from moving in the direction of chain advancement, the restraining means permitting the follower to move laterally with respect to the anchor so that the follower will follow lateral movement of the chain; at least one lubricant nozzle carried by the follower and directed toward the chain; a source of lubricant; and delivery means between the source of lubricant and the nozzle for forcing lubricant out of said at least one lubricant nozzle and onto the chain, whereby the lubricant will be deposited at the correct lateral location on the chain notwithstanding lateral movement of the chain.

4,009,765

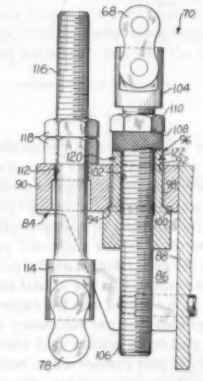
ADJUSTABLE LIFT CHAIN ANCHOR FOR FORK LIFT MAST UNITS

Edward V. Leskovec, Eastlake, and James A. Kulhanek, Perry, both of Ohio, assignors to Towmotor Corporation, Mentor, Ohio

Filed May 7, 1975, Ser. No. 575,303

Int. Cl.² B66B *9/20*; **F16G** *11/12*

U.S. Cl. 187—9 E **7 Claims**



4. An adjustable anchor as an article of manufacture subsequently employable to provide an adjustable coupling with an adjacent end of a lift chain means in a fork lift mast unit, comprising

an adjustable anchor housing including means for attachment to a base structure and forming a bore with a spherical taper defined about one end thereof,

an adjusting sleeve extending through the bore and having an outer diameter substantially smaller than the bore to permit angular movement of the sleeve relatively to its axis within the bore, the sleeve forming a spherically shaped, annular shoulder arranged in facing relation with the spherical taper of the housing, the sleeve extending through the bore and defining an inner threaded bore for engagement with a suitable connector secured to the adjacent end of the lift chain means and having a threaded shank,

removable means arranged upon the sleeve for engagement with the housing opposite the spherical taper in order to retain the sleeve within the bore prior to its engagement with the threaded shank of the connector, and

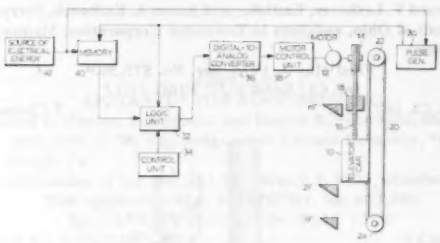
adjustable means for engagement with the adjacent end of the additional lift chain means arranged opposite the bore in the anchor housing from the attachment means, a peripheral surface portion of the sleeve being configured to facilitate its rotation within the bore of the anchor housing.

4,009,766

ELEVATOR CONTROL SYSTEM

Tsuyoshi Satoh, Inazawa, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 7, 1975, Ser. No. 548,079
Claims priority, application Japan, Feb. 21, 1974, 49-21093
Int. Cl.² B66B *3/02*
U.S. Cl. 187—29 R **3 Claims**



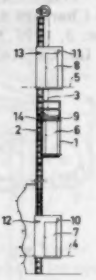
1. An elevator control system comprising, in combination, an elevator car, a traction sheave operatively coupled to said elevator car, an electric driving motor coupled to said traction sheave for vertically moving said elevator car, a governor sheave operatively coupled to said elevator car and having a shaft, pulse generator means disposed on the shaft of said governor sheave for generating a digital positional signal in the form of pulses in response to the actual amount of movement of the elevator car, a control unit for estimating the amount of movement of the elevator car necessary in response to a selected one of a call from within said elevator car and a call from a floor, a logic unit connected to both said pulse generator means and said control unit for effecting the arithmetical and comparative operation of said digital positional signal and said needed amount of movement of the elevator car to produce a digital signal, digital-to-analog converter means connected to said logic unit to convert said digital speed signal to an analog speed signal, motor control unit means connected to said digital-to-analog converter means and to said driving motor for controlling said driving motor in accordance with said analog speed signal, memory means connected to said pulse generator means to store said digital positional signal therein and also connected to said logic unit, and a source of electrical energy for supplying electrical energy to both said memory means and said pulse generator means during a failure of the normal power supply to said elevator control system, whereby when the normal power supply fails, said source of electrical energy supplies power to said pulse generator means and said memory means and said pulse generator means continues to generate digital position signals until the elevator car slows to a stop due to inertia thereof, and said memory means stores said digital position signals, and thereby when the normal power supply is restored the control system has available from said memory means the exact position of the stopped elevator car.

4,009,767

MAGNETICALLY ACTUATED LOCKING SYSTEM FOR ELEVATOR DOORS

Hans-Göran Stadigh, Undersaker, Sweden, assignor to Linden-Alimak AB, Skelleftea, Sweden

Continuation of Ser. No. 449,154, March 7, 1974, abandoned.
This application Sept. 12, 1975, Ser. No. 612,874
Int. Cl.² B66B *1/00, 13/18*
U.S. Cl. 187—31 **7 Claims**



1. In an elevator having a cage adapted to be moved by electrically operable drive means between a plurality of holding floors, each of said holding floors having a door associated with said cage, a device for mechanically locking said doors and for selectively unlocking the door associated with said cage at a holding floor where said cage is to be stopped, said mechanical locking device at each of said floors comprising a movable locking bolt which includes magnetic material, said bolt being positioned adjacent the door on said floor, spring means engaging said bolt for urging said bolt toward a locking position relative to said door and for normally holding said bolt in its said locking position, a coil surrounding said bolt and operable when energized to move said bolt to a nonlocking position against the force of said spring means, said bolt being retained in its nonlocking position against the force of said spring means by engagement of the free end of said bolt with an edge of said door when said door is at least partially open, circuit means at each of said holding floors for selectively energizing said coil at said floor, said circuit means including a locking activator located at a fixed position at an associated one of said plurality of holding floors for controlling the energization of the coil of the locking device at said floor, the locking activator at each of said floors comprising an energization source connected to said coil via a magnetic field responsive switch which is normally open and which is operable to close when subjected to an external magnetic field thereby to operatively connect said energization source to said coil, a lock actuator carried by said elevator cage, said lock actuator comprising normally inoperative magnet means carried by said elevator cage and a control switch on said elevator cage arranged to be selectively closed to cause said magnet means to emit a sufficiently strong magnetic field, at a distance transverse to the path of travel of said elevator cage and in a plane passing through the magnetic field responsive switch when said cage is at a holding floor where said cage is to be stopped, to close the magnetic field responsive switch in the locking activator at said floor thereby to energize the coil in the locking device at said floor to move the locking bolt at said floor to its nonlocking position, each of said locking devices also including an auxiliary electrical locking device comprising further electrical switch means disposed adjacent to its said locking bolt, said further switch means including a switching element connected to and movable with said locking bolt whereby the operating state of said further switch means is responsive to the position of its associated movable locking bolt, said locking bolt being operative to move said switching element to a position wherein said further switch means is open when said locking bolt is in its nonlocking position and to

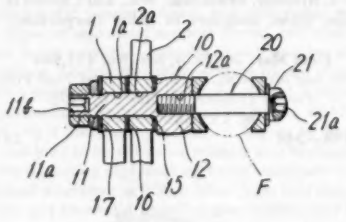
move said switching element to a different position thereby to close said further switch means when said locking bolt is in its locking position, an electrical circuit including each of said further switch means at said plurality of holding floors for controlling the energization of said electrically operative elevator drive means to prevent energization of said drive means when at least one of said bolts is in its nonlocking position and the associated further switch means is accordingly open, and means for selectively opening said cage-carried control switch to terminate the emission of said magnetic field, when it is desired to move said cage away from said holding floor, thereby to de-energize the coil of the locking device at said floor to permit said spring means to return said bolt to its locking position and simultaneously to close said further switch means when the associated door is fully closed.

4,009,768

CALIPER BRAKE FOR A BICYCLE

Yuji Fujii, Sakai, Japan, assignor to Shimano Industrial Company, Limited, Osaka, Japan

Filed Feb. 19, 1976, Ser. No. 659,568
Int. Cl.² B62L *1/12*
U.S. Cl. 188—24 **4 Claims**



1. A side-pull type caliper brake for a bicycle having a frame and a wheel including a rim, comprising:

a. a pair of brake shoes on opposite sides of the rim, respectively;

b. a pair of brake arms carrying said brake shoes, respectively, one of said brake arms being C-like shaped and the other of said brake arms being Y-like shaped;

c. a single support, rotatably supporting said brake arms, including a pivot having a first portion including an outer periphery supporting thereon said brake arms and a second enlarged diameter portion extending integrally from one end of said first portion, said first portion at the other end thereof having first screw threads at said outer periphery and a first rotary control means for adjusting the space between the rim and each of said brake shoes, said enlarged diameter portion having a first bore extending axially of said pivot and including second inner screw threads; and

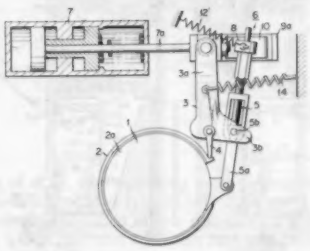
d. mounting means, independently connected to said single support, including a rod-like member having at one end third screw threads in mesh with said second inner screw threads, and secondary rotary control means, at the other end of said rod-like member, for attaching said single support to the frame.

4,009,769

AUTOMATICALLY ADJUSTING BRAKING DEVICE

Masatugu Nagatomo, Hirakata, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Continuation-in-part of Ser. No. 485,201, July 2, 1974, Pat. No. 3,918,556. This application Sept. 23, 1975, Ser. No. 615,927
The portion of the term of this patent subsequent to Nov. 11, 1992, has been disclaimed.
Int. Cl.² F16D *49/20*
U.S. Cl. 188—77 R **7 Claims**



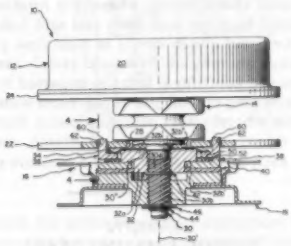
1. An automatically adjusting braking device for a band brake, which comprises a brake drum secured to a vehicle body with a brake band in engaging contact therearound with one end secured to an anchor means and the other end secured to an adjusting component wherein the anchor means is connected between the end of an actuating means and said adjusting component through a feed mechanism for driving said adjusting component and wherein a return spring is connected between said anchor means and the vehicle body.

4,009,770

HOIST BRAKE CONSTRUCTION FEATURING CAM DEVICES

Kenneth D. Schreyer, Clarence, N.Y., assignor to Columbus McKinnon Corporation, Tonawanda, N.Y.

Filed Nov. 10, 1975, Ser. No. 630,276
Int. Cl.² F16D *63/00*
U.S. Cl. 188—82.74 **13 Claims**



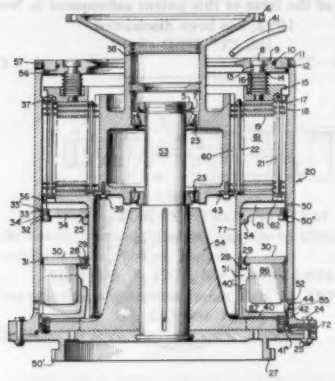
1. In a hoist utilizing a Weston brake having a ratchet assembly including a ratchet pawl and ratchet wheel, said ratchet assembly being employed during load lifting rotation of a hand wheel for the purpose of coupling a load wheel drive shaft for rotation with said hand wheel and during load lowering rotations of said hand wheel for the purpose of creating frictional braking effects tending to retard load lowering rotations of said drive shaft, the improvement comprising in combination:

cam means for maintaining said ratchet pawl and ratchet wheel in operative engagement during load lowering rotations of said hand wheel relative to said ratchet wheel.

4,009,771
SLIP FRICTION CLUTCH

John Crankshaw, Erie, Pa., assignor to Dynetics Inc.

Filed Mar. 17, 1975, Ser. No. 558,893
Int. Cl.² F16D 23/10
U.S. Cl. 192—105 A 26 Claims



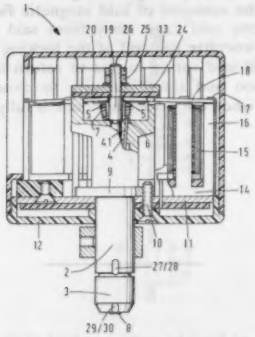
1. A clutch comprising,
a shaft having a sleeve connected thereto,
a hub rotatably supported on said shaft,
clutch means comprising first clutch means and second clutch means to be moved into frictional engagement with each other,
said first clutch means being attached to said sleeve and said second clutch means being attached to said hub,
enclosing means enclosing said clutch means providing a clutch cavity receiving said clutch means,
a clutch actuating piston slidably supported on means on said clutch and engaging with said first clutch means and pressure plate means supported on said clutch,
a spring plate engaging said second clutch means and spring means between said pressure plate and said spring plate means,
fin means on said sleeve for imparting a centrifugal force to oil,
and means for introducing oil to said clutch cavity for providing a viscous drag between said first clutch means and said second clutch means whereby a rotational force is transmitted between said shaft and said hub and means connecting said clutch cavity in fluid flow relation with said piston whereby oil from said clutch cavity flows to said fins and centrifugal force is imparted to said oil by said fins moving said oil into engagement with said actuating piston whereby said actuating piston forces said first clutch means and said second clutch means axially toward each other and toward said pressure plate means.

4,009,772
MOSAIC PRINTING HEAD

Wolfgang Glaser; Peter Krischke, both of Karlsruhe; Walter Steinbach, Donaueschingen, and Hans Joachim Steinmetz, Grunwettersbach, all of Germany, assignors to Steinmetz Krischke Systemtechnik GmbH, Germany

Filed Aug. 19, 1974, Ser. No. 498,527
Claims priority, application Germany, Aug. 22, 1973, 2342420
Int. Cl.² B41J 3/04
U.S. Cl. 197—1 R 8 Claims

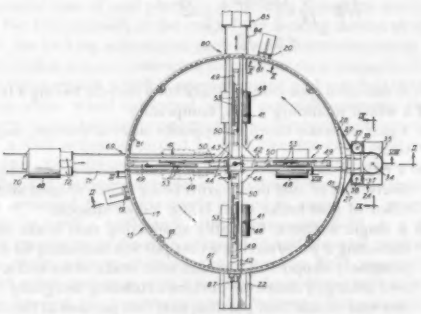
1. A mosaic printing head comprising a plurality of printing needles each having a tip and a base and disposed in a tubular supporting column, and operating means provided around said column and selectively actuatable to act on the needle bases to project the needle tips from said column, wherein said supporting column comprises a transverse wall of bearing metal near one end thereof, said wall being provided with a plurality of first guide holes receiving said needles adjacent their bases, said first guide holes having their axes arranged in a circle concentrically about the longitudinal axis of said column and extending at a slight inclination to said column axis, wherein the other end of said column is provided with an orifice member having means for guiding said needles adjacent their tips so as to extend parallel to one another in a row, and wherein said column contains a guide member intermediate its said ends, said intermediate guide member being of bearing metal and containing a plurality of second guide holes arranged in an ellipse about said column axis for receiving said needles, said intermediate guide member and orifice member being held in opposite ends of a sleeve insertable in said column.



4,009,773
PAPER ROLL HANDLING APPARATUS

Lawrence A. Brenner, Brookfield, Wis., and Charles H. Scholl, Vermilion, Ohio, assignors to Beloit Corporation, Beloit, Wis.

Filed Mar. 20, 1974, Ser. No. 452,944
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976
Int. Cl.² B65G 29/00
U.S. Cl. 198—344 24 Claims



1. Apparatus for handling paper rolls provided with center cores, comprising:
an elevated rotary carriage;
means supporting said carriage for rotation about a vertical axis;
a plurality of roll-suspending devices carried by said carriage in angularly spaced relation to one another about said axis;
each of said devices having means for supporting engagement within opposite ends of the center cores of the paper rolls;

means for operating said devices for selectively engaging with the roll center cores and suspending the rolls to be carried by said carriage and for releasing the rolls;

means for driving said carriage rotatably to advance the roll-suspending devices successively into a plurality of station positions which are angularly spaced from one another in the direction of rotation of the carriage; and

said carriage comprising a downwardly facing ring, and said supporting means comprising a plurality of stands circumferentially spaced about the ring and having upwardly facing roller means supporting the ring.

4,009,774
CONVEYOR

David E. Lutz, 330 Washington Lane, Carlisle, Pa. 17013

Continuation of Ser. No. 304,432, Nov. 7, 1972, abandoned. This application Oct. 29, 1974, Ser. No. 519,179
Int. Cl.² B65G *25/04*
U.S. Cl. 198—773 **4 Claims**

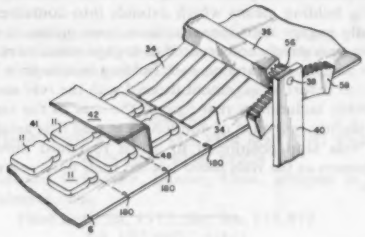
1. A conveyor for shifting a load comprising a base, load support means mounted on said base, said load support means including longitudinally extending static support means for supporting and restraining said load, said static support comprising a longitudinally extending beam mounted on said base, longitudinally extending roller support means laterally spaced from said static support means and generally parallel thereto, said roller support means comprising a pair of longitudinally extending roller conveyors, one on each side of said beam, the upper surface of said roller means and said static support means lying in substantially the same horizontal plane and normally supporting said load, a walking beam conveyor between said static support means and said roller means and closely adjacent said static support means, said walking beam conveyor being movable vertically from a position wherein its upper surface is below the upper surface of said static support means to a position wherein its upper surface is slightly above said upper surface of said static support means, said load being relatively rigid and having a limited degree of flexibility to permit said load to be deflected relative to a horizontal plane, means for actuating said walking beam conveyor to partially lift said load whereby the load is lifted from said static support means but not from said roller support means, and longitudinal drive means for shifting said walking beam conveyor longitudinally of said base whereby said load is moved over said roller means.

4,009,775
APPARATUS FOR INVERTING ROWS OF FRENCH TOAST

Robert Wolfelsperger, Fairfield, and Richard J. Bozzo, Wyckoff, both of N.J., assignors to Sandco Ltd., Ottawa, Canada

Division of Ser. No. 499,703, March 11, 1974. This application Apr. 16, 1976, Ser. No. 677,569
Int. Cl.² B65G *47/24*
U.S. Cl. 198—403 **9 Claims**

1. An apparatus for inverting products on a conveyor, the combination of, an inverting means positioned transversely of the conveyor and adapted to swing about a horizontal axis, a pair of spur gears positioned respectively at the opposite ends of said inverting means in axial alignment therewith and fixed thereto, a first arm assembly comprising a first shaft structure and a first pair of vertical arms mounted respectively upon the ends thereof, a second shaft structure and a second pair of vertical arms mounted respectively upon the ends thereof, said shaft structures having concentric axes positioned substantially below said inverting means and parallel thereto, one of each of said pairs of arms being positioned adjacent one side edge of the conveyor and the other of each of said pairs of arms being positioned adjacent the other side edge of the conveyor, said first pair of arms respectively supporting said spur gears, a pair of gear segments meshing respectively with said pair of spur gears and mounted respectively upon said

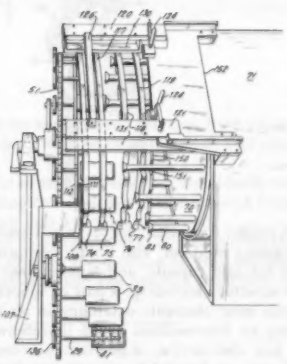


second pair of arms, cam-operating means comprising a pair of cam followers mounted respectively upon one of each of said pairs of arms and cam means presenting a pair of cam surfaces on which said cam followers rest, and means to impart synchronized swinging movements to said pairs of arms by imparting movement from a single power source to said cam means.

4,009,776
CAN UNLOADER

John P. Skrypek, Mahwah; Arnold Peters, West Paterson, and Robert Williams, Randolph, all of N.J., assignors to Sun Chemical Corporation, New York, N.Y.

Filed Nov. 6, 1974, Ser. No. 521,359
Int. Cl.² B65G *47/00*
U.S. Cl. 198—478 **10 Claims**



1. Apparatus for unloading empty containers from an in-feed conveyor and delivering same to a takeoff conveyor, said apparatus including a continuously rotating assembly having in-feed and out-feed regions at opposite sides thereof, said assembly including a rear section having a first plurality of pockets along the periphery thereof and a front section having a second plurality of pockets along the periphery thereof with the pockets of the first and second pluralities of pockets being in front to rear alignment, an in-feed conveyor chain moving along a path including a portion where motion of said chain blends with motion of said assembly between said input and output regions, said first plurality of pockets being positioned to receive containers delivered by said chain, said assembly also including a plurality of rods aligned with said pockets and extending generally parallel to the rotational axis of said assembly, control means for axially moving said rods rearward

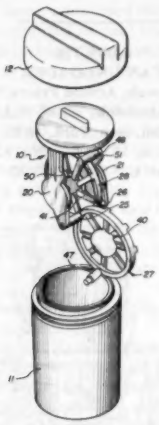
to engage containers on said conveyor chain and then moving such containers forward from said pockets of the rear section to said pockets of the front section to strip these containers from said chain, takeoff conveyor means operatively positioned at said output region to receive containers from said front section, said chain mounting a plurality of pin carriers extending generally perpendicular to the general plane of movement for said chain, said carriers at their forward ends having holding means which extends into containers to frictionally engage their inner surfaces, cam means at said input region operatively constructed to engage containers and move them slightly forward on said holding means to a first axial position before engagement thereof with the rear section, said assembly including a rear stop to the rear of the rear section and slightly rearward of containers at said first axial position, said rear stop positioned to arrest rearward movement of containers as the rods move toward their most rearward positions.

4,009,777

CONTACT LENS HOLDER

Michael D. Thomas, Elmhurst, Ill., assignor to Ryder International Corporation, Schaumburg, Ill.

Filed Dec. 29, 1975, Ser. No. 645,280
Int. Cl.² A45C *11/00*; B65D *85/54*; B08B *3/04*
U.S. Cl. 206—5.1 **11 Claims**



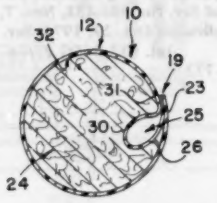
1. A holder for contact lenses to be immersed in a sterilizing or cleansing medium, said holder comprising; a capsule; lid means for said capsule; and lens retainer structure, said retainer structure including, a pair of spaced generally parallel elongate mast elements extending in an axial direction and defining an intermediate space therebetween which is free from any obstruction, a pair of open-top basket members pivotly mounted relative to said mast elements and movable both into and out of said intermediate space defined by said mast elements, said basket members being disposed in back-to-back, oppositely facing relation such that the top of each basket member opens toward the adjacent mast element, said basket members being pivotal to or from a first position wherein they are disposed in said intermediate space, with the open top portion thereof aligned with a surface portion of the adjacent mast element, such that said mast element will operate to retain a lens in position within said basket member, and each said basket member being movable to or from a second position, out of alignment with the respective mast member to provide for the initial positioning or removal of a lens element, and each said basket member including a rim, centrally disposed web means defining the bottom portion of said basket member and providing support for the lens to be disposed therein, said web means providing a substantial open area in said bottom portion for the entry of cleansing or sterilizing medium, such that when said basket members are in said first position, said lenses will be maintained within the basket members, with the opposite surfaces of said lenses being exposed to the fluid medium.

4,009,778

DUAL COMPARTMENT PACKAGE AND METHOD FOR MAKING SAME

Duane Aaron Howell, Davenport, Iowa, assignor to The Kartridg Pak Co., Davenport, Iowa

Filed Nov. 4, 1975, Ser. No. 628,477
Int. Cl.² B65D *25/08*, *77/06*
U.S. Cl. 206—219 **15 Claims**



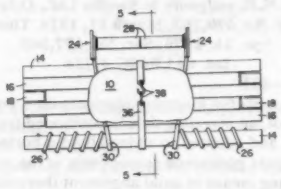
1. A dual compartmented package comprising
a first compartment made of pliable-film material;
a second compartment made of a portion of said pliable-film material, disposed within said first compartment, and attached thereto along a common sealing engagement therebetween which is substantially parallel to the longitudinal axis of said first compartment from one end thereof to the other;
fluent materials of different composition within said package in said first and second compartments therein, the common sealing engagement between said first and second compartments joining three plies of said pliable film material folded upon one another with two plies being portions adjacent the opposed parallel side edges of said material joined with said edges in aligned adjacent registration, and an additional portion of said film material adjacent one of said side edges forming said second compartment with its opposing boundary including the third and innermost ply of said common sealing engagement; said compartments being cooperatively gathered and closed at each end.

4,009,779

KIT FOR USE IN PLAYING VOLLEYBALL OR THE LIKE

Norman V. Frye, R.R. 4, Davenport, Iowa 52804

Filed May 24, 1976, Ser. No. 689,056
Int. Cl.² B65D *85/20*
U.S. Cl. 206—315 R **10 Claims**



1. A kit for playing volleyball or the like, comprising a pair of generally Z-shaped ground anchors, each having a generally hollow cylindrical ground-penetrating part, a post-supporting part and a pair of parallel legs extending between the parts, said parts lying generally on parallel axes and extending re-

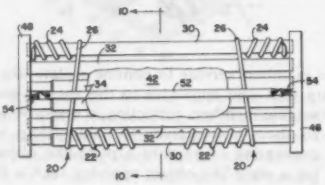
spectively in opposite directions from the legs, the legs being spaced apart on the order of the inside diameter of the ground-penetrating part, said anchors being arranged in the kit with their post-supporting parts coaxial and facing toward each other and the ground-penetrating parts coaxial and facing away from each other, a plurality of net post sections, including a first section passed through the coaxial ground-penetrating parts and additional sections parallel to the first section and passed through the spaced-apart legs, and means holding the anchors and posts together.

4,009,780

VOLLEYBALL OR LIKE KIT

Norman V. Frye, R.R. 4, Davenport, Iowa 52804

Filed May 24, 1976, Ser. No. 689,058
Int. Cl.² B65D *85/20*
U.S. Cl. 206—315 R **12 Claims**



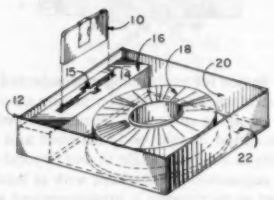
1. A kit for use in playing volleyball or the like, comprising a pair of generally Z-shaped ground anchors, each having a ground-penetrating helix, a post-supporting helix, and a leg extending between and interconnecting the helices, the helices being formed on parallel axes and extending respectively in opposite directions from the leg, the leg joining each helix at its respective first turn and said helices being tangential to the leg at the same side thereof, said anchors being arranged in the kit with the one helix of one anchor in axial alinement with one helix of the other anchor and the other two helices being in coaxial alinement with each other, and with the legs spaced apart axis-wise as respects the helices; a plurality of net post sections of substantially equal length including a first section passed through one pair of coaxial helices and a second section passed through the other pair of co-axial helices; a pair of end members respectively engaging opposite ends of the post sections; and means releasably securing the end members together with the post sections confined between them.

4,009,781

SLIDE TRAY AND TAPE CASSETTE CONTAINER

Paul G. Agnew, Braintree, and Stephen P. Becker, Framingham, both of Mass., assignors to Learncom, Inc., Boston, Mass.

Filed Jan. 12, 1976, Ser. No. 648,478
Int. Cl.² B65D *85/672*
U.S. Cl. 206—387 **11 Claims**



1. A container for the shipment, storage and organization of a slide tray and associated tape cassette comprising:

a first casing member forming a walled enclosure having a bottom and sides;

a first compartment within said first casing member for receipt of said slide tray;

a rectangular cassette storage member mounted securely to abut an inner adjacent side and bottom of said first casing member, said horizontal storage member having an upper surface being recessed in relation to the height of said abutting casing side and having at least one aperture compartment therethrough for receipt of said tape cassette; and

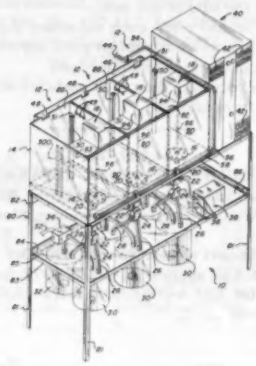
a second casing member to cover said first casing member and to be removable therefrom to completely expose said first compartment and said cassette storage member.

4,009,782

METHOD AND APPARATUS FOR SORTING AND COUNTING FISH EGGS

Derald Edward Grimshaw, Denver, Colo., assignor to Roe, Inc., Palmyra, Wis.

Filed Sept. 26, 1975, Ser. No. 616,872
Int. Cl.² B07C *5/342*
U.S. Cl. 209—73 **48 Claims**



1. An apparatus for sorting dead fish eggs from a container storing a batch of both live and dead fish eggs, said apparatus comprising:

means connected to said container for individually separating and injecting fish eggs at a predetermined frequency from said batch into a moving fluid, and

means responsive to a dead fish egg in said moving fluid for diverting the flow of the portion of said moving fluid containing said dead fish egg out of a main flow of said fluid.

4,009,783

FRICTION SEPARATOR

Joseph K. Park, Corvallis, Oreg., assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Oct. 2, 1975, Ser. No. 618,921
Int. Cl.² B07C *5/06*
U.S. Cl. 209—108 **1 Claim**

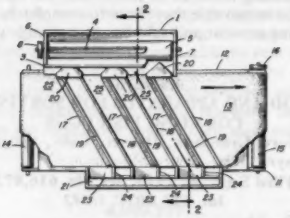
1. A device for separating rough particles from smooth particles, comprising in combination

a. a flat belt for conveying the particles to be separated, the surface of said belt being constructed of a friction-creating material which will grip the rough particles having a high coefficient of friction but not the smooth particles having a low coefficient of friction,

b. means for traversing said belt,

c. means for feeding the particles to be separated onto said belt,

d. a plurality of separators, each comprising a bar of yieldable material, mounted over said belt, parallel to and just touching the surface thereof, and extending at an angle of about 45° to the length of the belt, said separators cooperating with said belt to permit the rough particles gripped by said belt to be carried under said separators and to move the smooth particles not gripped by said belt to the side of said belt,



e. means for receiving smooth particles which have been moved to the side of the belt,

f. collector means after each separator cooperating with said belt to remove the rough particles which have been conveyed under said separator, and

g. means for receiving the rough particles which have been removed from said belt.

4,009,784

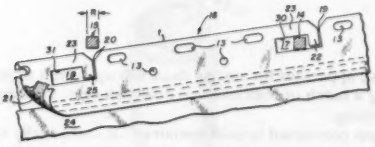
DOCUMENT HANGING APPARATUS

Abram G. Elias, 1527 Greg St., Sparks, Nev. 89431, and Peter G. Elias, 6 Wedgewood Drive, Winnipeg, Manitoba, Canada (R3T2J8)

Continuation-in-part of Ser. No. 514,890, Oct. 15, 1974, Pat. No. 3,923,353. This application Oct. 8, 1975, Ser. No. 620,569

Int. Cl.² A47B *63/00;* **B42F** *15/00*

U.S. Cl. 211—46 **15 Claims**



1. Document hanging apparatus, comprising:

an elongated strip of flexible material having a foldline extending along its length and at least two pairs of apertures provided therein, the apertures of each pair being symmetrically disposed about said foldline, said strip also having a slit proximate each of said pairs of apertures and extending from a side portion of one of the apertures of the pair to the corresponding side portion of the other aperture of the pair, said strip being folded along said foldline to form a document receiving slot; and

means for fastening a document to said strip.

4,009,785

FIXTURE AND SYSTEM FOR HANDLING PLATE LIKE OBJECTS

Terence John Trayes, Phoenix, Ariz., assignor to Motorola, Inc., Chicago, Ill.

Filed Oct. 2, 1974, Ser. No. 511,324

Int. Cl.² B65G *53/50*

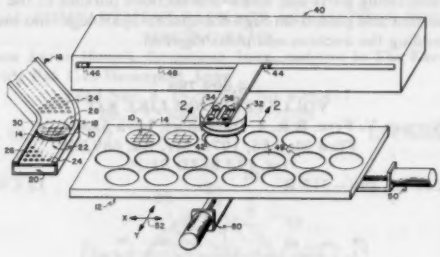
U.S. Cl. 214—1 BT **15 Claims**

6. An apparatus for handling plate like objects, which comprises:

1. a gas actuated device having a surface for releasably picking up the plate like objects,

2. means for moving said pickup device from a first to a second position, and

3. a plurality of retractable members extending from the pickup surface of the device and surrounding an area of the pickup surface of the device, the area being dimensioned to receive one of the plate like objects, said re-



tractable members serving to confine a plate like object picked up with said apparatus to the area so enclosed, said retractable members retracting in response to force applied to them orthogonally to said pickup surface, thereby preventing damage to a plate-like object or a support for a plate-like object applying such a force to said retractable members.

4,009,786

METHOD OF AND APPARATUS FOR HANDLING FABRIC WORKPIECES

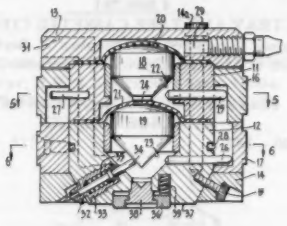
Kenneth Joseph Littlewood, 14 Duscson Drive, Templestone 3106, Australia

Filed Nov. 12, 1975, Ser. No. 630,964

Claims priority, application Australia, Dec. 2, 1974, 9880/74

Int. Cl.² B65H *3/22*

U.S. Cl. 214—8.5 C **11 Claims**



1. A pick-up device for assembling a preselected number of sheets from several stacks thereof comprising a body member having a sheet engaging surface, a plurality of pointed members slidably mounted in said body member and adapted to extend outwardly at an acute angle to and beyond said engaging surface for sequential engagement with at least one sheet in each stack so as to provide a predetermined assembly of sheets from said stacks for transfer to a processing station, and actuating means in said body member adjustably movable with respect to said pointed members for limiting the extension of said pointed members so as to control the number of sheets engaged in each stack.

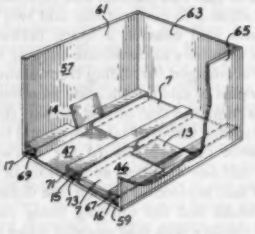
4,009,787
PALLET FORMER

Ira W. Beal, Hudson, Ill., assignor to Funk Seeds International, Inc., Bloomington, Ill.

Division of Ser. No. 395,588, Sept. 10, 1973, Pat. No. 3,946,883. This application Sept. 25, 1975, Ser. No. 616,779

Int. Cl.² B65G *1/14*

U.S. Cl. 214—10.5 R **1 Claim**



1. A structure for forming a flexible sheet into a pallet comprising a box for receiving the flexible sheet and forming it into a pallet therein, said box having an open side, a bottom and three upstanding sides, bars attached to the top surface of the bottom of said box, each such bar having at least one planar side for folding the flexible sheet thereover to form a pallet having upstanding sides defining channels for receiving prongs of a forklift truck to lift the pallet, said bars including a pair of centrally disposed spaced apart bars, their planar sides being the outer sides of the pair, extending into the box parallel to opposing upstanding sides thereof from said open side and another bar positioned on either side of and parallel to said centrally disposed bars, each of the other bars having its planar side facing the centrally disposed bars and being positioned near an upstanding side of said box, the location of all bars being such to accommodate prongs of a forklift truck between said centrally disposed bars and between each of said other bars and its related box side for lifting the pallet at the channels formed over the bars.

4,009,788
APPARATUS FOR TRANSFERRING FUEL BETWEEN SPACES WHICH ARE AT DIFFERENTIAL PRESSURES

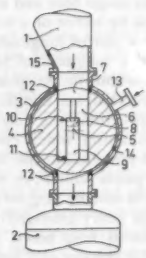
Reinhard Waldhofer, Essen, Germany, assignor to Shell Internationale Research Maatschappij B.V., Den Haag, Netherlands

Filed May 28, 1975, Ser. No. 581,574

Claims priority, application Germany, May 30, 1974, 2426035

Int. Cl.² B65G *47/82*

U.S. Cl. 214—17 B **6 Claims**



1. In an apparatus for transfering fuel between spaces which are at differential pressures, a combination comprising first wall means bounding a first space which is at a first pressure; second wall means bounding a second space which is at a higher second pressure; transfer means for transferring finely divided solid material from one of said spaces into the other space, comprising a casing bounding a spherical chamber having two openings which communicate with the respective spaces, a spherical body provided with a blind bore having an open end, said body being turnable in said chamber between two end positions in each of which said open end registers with a respective opening, and a piston reciprocable in said bore for drawing a quantity of said solid material into said blind bore when the open end thereof registers with one of said openings and for expelling said quantity when said open end registers with the other of said openings, said body and said casing having respective juxtaposed surfaces which together bound a clearance, and means for admitting into said clearance an inert gas at a pressure higher than said second pressure.

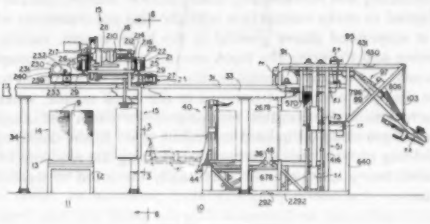
4,009,789
MACHINE FOR FEEDING STACKED ARTICLES

Kenneth R. Runyan, Dayton; Quentin E. Honnert, Cincinnati, and Ronald H. Porter, Milford, all of Ohio, assignors to Multifold-International, Inc., Milford, Ohio

Division of Ser. No. 437,167, Jan. 28, 1974, Pat. No. 3,907,273. This application June 27, 1975, Ser. No. 590,966

Int. Cl.² B65H *31/40*

U.S. Cl. 214—6 S **5 Claims**



1. In combination with a conveyor having spaced conveyor belts, a machine for straightening and positioning a stack of articles on the conveyor which comprises a tip-over device swingably mounted at a tip-over station on the conveyor, the tip-over device including fingers which extend between the belts when the tip-over device is in upright position, stack supporting means extending substantially perpendicular to the fingers, and a stack catching member mounted at the outer end of the stack supporting means extending transversely of the stack supporting means on the same side thereof as the fingers, the stack catching member engaging the face of the stack remote from the fingers when the tip-over device is in tipped over position, the stack catching member being spaced from the fingers a distance greater than the height of the stack, means for advancing the conveyor to bring the stack to the tip-over station, means for swinging the tip-over device so that the fingers pick up the stack from the belts and swing the stack against the stack supporting means as the tip-over device is tipped to a position in which the stack supporting means is substantially horizontal so that the stack falls against the stack catching member and the articles in the stack are free to move crosswise of each other, the stack supporting means supporting the stack free of the conveyor, clamps supported on the tipover device on opposite sides of the stack supporting means and engageable with the sides of the articles of the stack, means for drawing the clamps toward the stack supporting means to engage the articles in the stack to align the articles with each other and to center the stack, means for returning the tip-over device to upright position to return the stack to the belt conveyors when the stack has been straightened and positioned and means for advancing the conveyor in an opposite direction to remove the stack from the tip-over station.

4,009,790

SIDE-DUMPING SLAG POT CARRIER

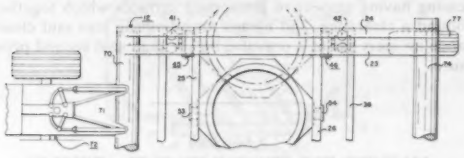
Gibson E. Brock, R.D. 5, Persimmon Road, Sewickley, Pa. 15143

Continuation-in-part of Ser. No. 564,553, April 2, 1975, abandoned, which is a continuation-in-part of Ser. No. 465,864, May 1, 1974, Pat. No. 3,897,881. This application Jan. 22, 1976, Ser. No. 651,537

The portion of the term of this patent subsequent to Aug. 5, 1992, has been disclaimed.

Int. Cl.² B65G *65/04*

U.S. Cl. 214—317 **8 Claims**



1. A rubber-tired vehicle for plant roadway and off highway carriage of heavy loads comprising a tractor unit and a trailer unit comprising an elongated load-carrying bridge supported at its front and rear ends by the tractor and a pair of wheels respectively, means for picking up and dumping a slag pot or the like provided with trunnions comprising a pair of hook means suspended from the bridge and spaced from each other longitudinally thereof, coupling means affixed to the bridge in a vertically and horizontally fixed position relative thereto and adapted to make connection with the slag pot trunnions while it is suspended above ground in the hook means, means for raising and lowering the hook means relative to the coupling means, and means for rotating the coupling means so as to tip the slag pot about its trunnions in the hook means, whereby the trunnions are elevated into position in which said coupling means are coupled to said trunnions prior to the dumping of said slag pot, the pair of wheels supporting the rear end of the trailer being idler wheels individually mounted to straddle a load.

4,009,791

TRUCK DUMP-BODY OPERATING MECHANISM

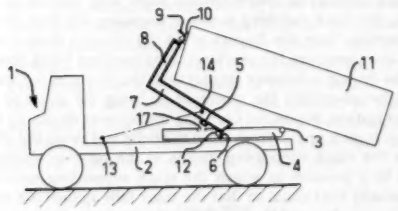
Christian Derain, Saint Aubin le Vieil Evreux, France, assignor to Societe Nouvelle des Bennes Saphem, La Neuve-Lyre, France

Filed Sept. 23, 1975, Ser. No. 615,890

Claims priority, application France, Oct. 2, 1974, 74.33245

Int. Cl.² B60P *1/64*

U.S. Cl. 214—501 **4 Claims**



1. In a vehicle comprising a dump-body with a fastening member carried on the front upper part of said dump-body and the stubs fixed to the underneath of said dump-body, a chassis with a fixed reaction point on the front of said chassis, a truck dump-body actuating mechanism mounted on said chassis and comprising in combination:

an L-shaped pivot member including a vertical branch with an outer upper end and a horizontal branch with an outer rear end, horizontally translatable between a forward position and a rearward position relative to said chassis, an automatic hook borne on the upper end of said vertical branch and cooperating with said fastening member, tilting means articulated about a tilting axis transverse to said chassis, fixed at the outer end of said horizontal branch, a slipper carried by said horizontal branch, the distance between said slipper and said tilting axis being fixed, a thrust point on the horizontal branch,

two parallel side members comprising tilting means articulated about a tilting axis transverse to said chassis, fixed at the rear end of said two parallel side members at the rear end of said chassis to connect the said two parallel side members with said chassis, a space between said two parallel side members to constitute slipping means where said slipper is engaged for sliding translation, an opening at the upper part of said parallel side members and having a size at least equal to that of said slipper, stop means for limiting the sliding travel of said horizontal branch of said L-shaped pivot member toward the rearward position fixed at the said side members and in front of a correspondent part of said horizontal branch, the distance between said stop means and the opening being such that said slipper is in registry with said opening when said horizontal branch bears against said stop means to reach a pivoted position, projecting catch means upon the upper part of said side members to be in engaging relationship with said stubs fixed to the underneath of said dump-body to impart lateral stability to the latter in its loaded position.

and a single jack for controlling horizontal sliding and pivotal motion, connected between said fixed reaction point on the front of said chassis and said thrust point on said horizontal branch.

4,009,792

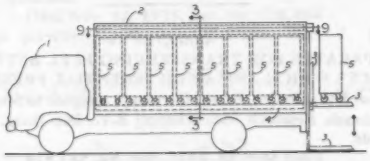
CARGO CONVEYING APPARATUS ON MOTOR TRUCK

Namito Sano, and Yu Tsuchiya, both of Kariya, Japan, assignors to The Coca-Cola Co., Atlanta, Ga

Filed Nov. 13, 1975, Ser. No. 631,585

Int. Cl.² B60P *3/00*

U.S. Cl. 214—83.3 **1 Claim**



1. A cargo conveying apparatus on a motor truck comprising a motor truck having a cargo carrier truck bed, a series of conveying mechanisms being provided on the truck bed for transporting a movable cargo fore and aft to the longitudinal axis of the motor truck by virtue of a longitudinal conveying means which includes a pair of longitudinal rails installed on the truck bed, a pair of longitudinal feed pawls which are reciprocably installed within the longitudinal rails to convey cargoes only in one direction, and connecting means for reciprocating, in opposite directions, the longitudinal feed pawls, a lateral conveying mechanism which consists of lateral rails installed in the lateral direction at the front end of the truck bed and lateral feed pawls which are reciprocably installed within the lateral rails to convey cargoes only in one direction, said lateral feed pawls being provided with twice as long a stroke as the longitidinal feed pawls and wherein driving means are provided for driving said longitudinal and lateral conveying mechanisms simultaneously by virtue of the interlock device and further wherein the driving means comprises a fluid pressure cylinder unit which serves as a power source for driving said longitudinal and lateral conveying mechanisms simultaneously by virtue of the interlock device, and further

wherein the fluid pressure cylinder unit is installed longitudinally along the longitudinal rails on the unloading side of the motor truck and wherein a T-lever interlock device is rotatably supported at the center of the truck bed on a shaft located on the floor, with either of its legs being fitted between a couple of rollers installed on the longitudinal feed pawls, and further wherein the forward end of a piston of the fluid pressure cylinder unit is connected to said legs, with the other leg of the T-lever carrying a projected pin, which is fitted in the oblong hole made in one end of the T-level rotatably supported by said shaft on the truck bed floor, all of which conveying mechanisms cooperate together to move cargo in a rotational manner about the truck bed by virtue of said interlock device which interconnects the said longitudinal conveying mechanism with said lateral conveying mechanism, and wherein pallet means are provided for transporting said movable cargo fore and aft to the longitudinal axis of the motor truck, said pallet means comprising a rectangular box member having frames on the four sides, castors at four corners on the bottom of the box member, rollers at the top four corners of the box member, all of said castors being pivotally supported on shafts and installed at right angles with the box member, and further wherein L-shaped stoppers are provided at both ends of the pallet means, and wherein said guide rails are laid and positioned on the truck bed respectively with the same spacing as the distance between the castors of said pallet means, and further wherein the intersecting points of said guide rails are formed into a nearly triangular space to allow easy turning of the castors when the direction of travel of the pallet means is changed, whereby a more efficient loading and unloading operation is provided in conjunction will all of the area of the truck bed without producing a dead space on the truck bed.

4,009,793

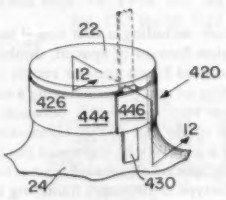
TAMPER-PROOF CLOSURE SEAL

David Ellsworth Minesinger, Fort Thomas, and Thomas Foster Leslie, Covington, both of Ky., assignors to The Procter & Gamble Company, Cincinnati, Ohio

Continuation of Ser. No. 488,103, July 12, 1974, abandoned. This application Apr. 15, 1976, Ser. No. 677,340

Int. Cl.² B65D *41/54*

U.S. Cl. 215—246 **1 Claim**



1. Seal apparatus extending around the rim of a container closure overlapping an adjacent portion of the container to provide tamper-proof means for securing such closure immovably relative such container comprising, in combination, a length of heat shrinkable adhesive tape having a leading end portion and a trailing end portion, said length of heat shrinkable adhesive tape being wrapped around and adhered to both the container and the closure extending across the interface therebetween with said trailing end portion overlapping said leading end portion and a non-heat shrinkable tear strip adhered to the adhesive tape beneath both said leading and trailing end portions thereof masking said adhesive thereat, said tear strip extending generally transversely across said leading end portion of said heat shrinkable adhesive tape beneath the adhesive face thereof, over a side edge of said leading edge portion and back across the non-adhesive face of leading edge portion beneath the adhesive face of said overlapping trailing end portion and generally laterally outwardly thereof defining a pull tab, said heat shrinkable adhesive tape having been heated and shrunk at least at said overlapping trailing end portion so that said pull tab is curled generally obliquely toward said side edge and outwardly of said closure and container.

4,009,794

LEVER-ACTUATED CLOSURE DEVICE

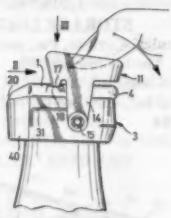
Walter Zapp, Oberegg, Switzerland, assignor to I D F Company Ltd., Basel, Switzerland

Filed Apr. 26, 1976, Ser. No. 680,059

Claims priority, application Switzerland, May 2, 1975, 5785/75; May 2, 1975, 5787/75

Int. Cl.² B65D *81/24*

U.S. Cl. 215—210 **22 Claims**



1. A lever-actuated closure, for bottles or the like containers, comprising a collar or base part adapted for being fixed to the rim of an orifice of the container which is to be closed, a closing member one side of which is hingedly connected to said collar, an actuating member having a manually operated gripper part and being hingedly mounted on said collar below the outlet orifice, and a connecting member hingedly attached to the actuating member and to the closing member at the outside thereof, which closure can be transferred, by means of the actuating member, from an open position, in which the closing member frees the outlet orifice, through elastic deformation of at least one of the said parts of the closure, via a dead-center position, in which the hinge axis of the actuating member and the two hinge axes of the connecting member are in a common plane, into a closed position, in which the closing member seals the outlet orifice, or vice versa from this closed position into the open position, the gripper part of the actuating member being, in the closed position, above the elastically deformed closing member and being movable sideways and downwards, relative to the closing member for opening the closure.

4,009,795

COMBINED REFLECTOR PAN AND TRIM RING

Bohdan Hurko, and Raymond L. Dills, both of Louisville, Ky., assignors to General Electric Company, Louisville, Ky.

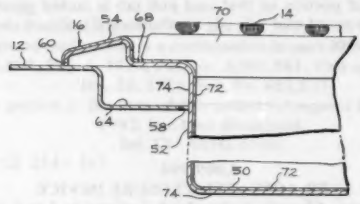
Filed Dec. 8, 1975, Ser. No. 638,896

Int. Cl.² B65D *25/14*

U.S. Cl. 220—64 **2 Claims**

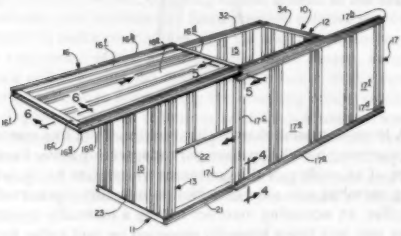
1. A combined reflector pan and trim ring for use in supporting an electric surface heating unit, said pan comprising a bowl-shaped container formed of composite sheet material having an upper layer of aluminum and a lower layer of steel selected from the group of materials comprising stainless steel and aluminized steel, said container having an outwardly

extending flange adjacent its top edge to serve as a decorative trim ring for encircling the surface heating unit, said upper



aluminum layer being of high reflectivity and high resistance to discoloration at high temperatures above about 750° F.

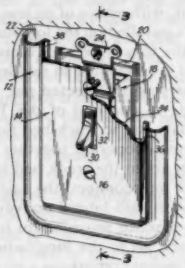
4,009,796
STORAGE LOCKER
Dietrich F. Schmidt, Carlisle, Pa., assignor to Capitol Products Corporation, Mechanicsburg, Pa.
Filed Aug. 20, 1975, Ser. No. 606,184
Int. Cl.² B65D *7/42*, *43/20*
U.S. Cl. 220—84 **22 Claims**



1. A storage locker comprising a base frame, a top frame, a plurality of panels joining said base frame to said top frame to form a rectangular box-like construction having an access opening within said top frame and a second access opening between said base frame and said top frame, a slidably movable horizontally and slidably removable horizontally lid horizontally mounted on said top frame, and a slidably movable horizontally and slidably removable horizontally door vertically mounted on said top frame and said bottom frame.

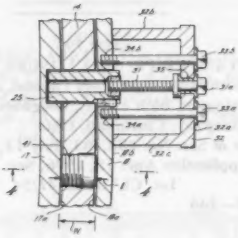
4,009,797
WALL PLATE FOR ELECTRICAL SWITCHES, ELECTRICAL OUTLETS AND THE LIKE
Martin Lee, Yonkers, N.Y., assignor to American Tack & Hardware Co., Inc., Monsey, N.Y.
Filed July 22, 1976, Ser. No. 707,602
Int. Cl.² H02G *3/14*
U.S. Cl. 220—242 **10 Claims**

1. A wall plate adapted to be secured to an electrical apparatus disposed in a mounting surface and comprising a frame, an insert received by said frame, said insert defining a front wall having a front face and a back face at least one fastening-receiving aperture defined in said insert and at least one apparatus-receiving aperture defined in said insert, means cooperating with said fastening-receiving aperture for securing said insert to said electrical apparatus with said insert adapted to maintain said frame against the mounting surface when said insert is secured to said electrical apparatus, and means projecting from said back face of said insert and toward said electrical apparatus for preventing said insert from being damaged as said insert is secured to said electrical apparatus by acting as a stop preventing further movement of said insert



toward said electrical apparatus under the influence of said securing means.

4,009,798
VESSEL CONNECTOR
Raymond E. Pechacek, Houston, Tex., assignor to Hahn & Clay
Filed May 7, 1975, Ser. No. 575,578
Int. Cl.² B65D *45/16*
U.S. Cl. 220—325 **15 Claims**



1. A vessel structure including a first vessel section having an annular end portion formed of spaced, double concentric connector rings separated by an annular recess and a second vessel section including an end portion having a single connector ring for insertion into said recess between said double connector rings, said single and double connector rings being releasably joined by a plurality of improved pin-type connectors circumferentially spaced about said connector rings, each of said improved pin-type connectors including the following elements:

said spaced, double connector rings having aligned openings therein;

said single connector ring having an opening therein which is substantially alignable with said spaced double ring openings;

a tapered pin inserted into said double and single ring alignable openings;

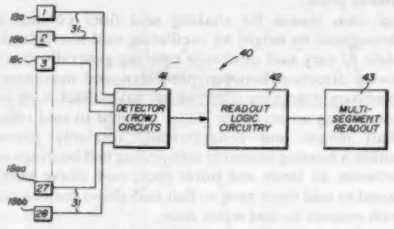
said single connector ring opening including means for allowing said tapered pin to pivot into full bearing engagement with said double ring openings with said single ring opening being in full bearing engagement with said pin under loaded conditions; and

said opening for said single connector ring including a tapered portion and an untapered portion, said tapered portion bearing directly against said tapered pin with said vessel under load conditions such that said tapered pin is pivoted into full bearing engagement with said double ring openings.

4,009,799
MONITOR FOR SEED PLANTING APPARATUS

George H. Fathauer, Mesa, Ariz., assignor to Dickey-john Corporation, Auburn, Ill.

Filed Nov. 10, 1975, Ser. No. 630,253
Int. Cl.² A01C 7/18
U.S. Cl. 221—3 18 Claims

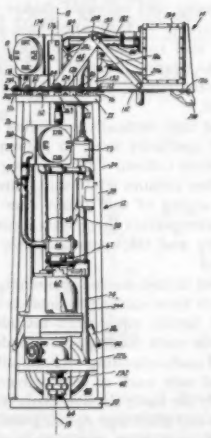


1. An apparatus for detecting and monitoring seeds passing through a plurality of seed dispensers of a multi-row planter in which said planter is pulled by a tractor means and is powered by a rotary shaft coupled between said planter and said tractor means, comprising: a plurality of seed detecting circuit means respectively associated with said seed dispensers, readout display means, logic circuit means coupled between said seed detecting circuit means and said readout display means and responsive to output signals from said seed detecting circuit means for energizing said readout display means to identify which of said dispensers is operating improperly; shaft rotation sensing means coupled to said shaft for developing a shaft signal corresponding to the rotational speed of said shaft; and indicating means coupled to said shaft rotation sensing means and responsive to said shaft signal for visually indicating that the shaft is rotating.

4,009,800
FLUID DISPENSER

John S. Loy; Melvin C. Hankel, and Elmer A. Robbins, all of Fort Wayne, Ind., assignors to Tokheim Corporation, Fort Wayne, Ind.

Filed Sept. 19, 1974, Ser. No. 507,268
Int. Cl.² B67D 5/22
U.S. Cl. 222—28 4 Claims

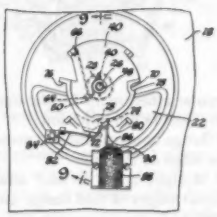


1. In a fluid dispenser which includes means for pumping, means for metering, and means for controlling the dispensing of a selected quantity of fluid, the combination comprising a base structure having upper and lower ends and enclosing said pumping and metering means, an arm assembly and bearing means pivotally mounting said arm assembly to said upper end for rotating movement through a predetermined arc about a vertical axis, a fluid dispensing hose connected at one end thereof to said pumping and metering means, said hose being coupled to and extending outwardly from the distal end portion of said arm assembly, electrically operable display means for visually displaying the quantity, price per unit volume, and total price of fluid dispensed, said display means being fixedly mounted in said arm assembly, a plurality of flexible electrical conductors extending between said base structure and said arm assembly and operatively coupling said display means to said metering means, junction boxes fixedly mounted in said base structure and said arm assembly, respectively, a conduit connected between said junction boxes and having a slip bearing therein, portions of said conductors extending between said junction boxes through said conduit, rotational movement of said arm assembly being accommodated by twisting of said conductors within said conduit.

4,009,801
WASHING AGENT DISPENSER FOR DISHWASHER

Richard B. Williams, Kettering, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Feb. 14, 1975, Ser. No. 549,907
Int. Cl.² B67D 5/08
U.S. Cl. 222—70 3 Claims



1. A multiple charge dispenser comprising a container having a plurality of compartments and a lid adapted to cover all of said compartments and selectively automatically or manually successively uncover each of said compartments, said lid having successive dispensing and pause stops affixed thereto and biased for movement therewith in one direction as said lid successively uncovers each of said compartments, a successive pair of said dispensing stops having a pause stop therebetween and laterally spaced therefrom during the movement of said stops in said one direction, each of said pair of dispensing stops having a ramplike camming surface, and a detent automatically movable and manually yieldable for releasing said lid for biased movement in said one direction, said detent repeatedly automatically movable in a shuttle step between a first detent position in alignment with the biased movement of said dispensing stops and a second detent position in alignment with the biased movement of said pause stop, the length of said shuttle step being equal to the lateral spacing between the dispensing stops and said pause stop, said detent as it moves repeatedly to said first detent position engaging successive dispensing stops to establish a plurality of lid orientations with respect to the compartments, and said detent as it moves to said second detent position engaging said pause stop between the establishment of successive lid orientations to precondition one of said pair of dispensing stops and said lid for establishing one lid orientation to uncover one of said compartments when said detent next moves to said first detent position, said detent as it subsequently again moves to said second detent position releasing said one of said pair of dispensing stops and said lid for biased movement of said lid and

said stops to the next following lid orientation to uncover the next succeeding one of said compartments, said detent in said first detent position being engaged in a sufficiently friction creating manner by said camming surface in response to the biased movement of said dispensing stops to prevent the movement of said lid in said one direction when said detent is in said first detent position and not being automatically moved for releasing said lid, said detent including spring means yieldable to the movement of said camming surface in said one direction in response to a sufficient manual force on said lid to overcome the friction created between said detent and said camming surface for successively manually uncovering each of said compartments, thereby to facilitate either automatic or manual movement of said lid in said one direction.

4,009,802

PAINT CAN ATTACHMENT

Leon Hayduchok, 15 Sandy Lane, Trenton, N.J. 08610

Filed Sept. 2, 1975, Ser. No. 609,425
Int. Cl.² B67D *1/16*
U.S. Cl. 222—108 **6 Claims**

1. A semicircular attachment for the open mouth of a paint can which comprises in combination:

a peripheral flange constructed and arranged to fit over and engage the edge of the can,

the internal straight edge of said attachment connected between inner edges of said flange and forming a narrow scraping ledge,

a paint well laterally enclosed between said peripheral flange and said narrow scraping ledge, and substantially depressed below the horizontal plane of said ledge,

said well having an opening in the lateral wall on the side opposite said ledge at a level substantially above the bottom of said well, and

a curved lip disposed between the upper edge of said opening and the inner edge of said flange.

4,009,803

WEB FORMER

Kenneth G. Lytton; George J. Miller, and James E. Donnelly, all of Gastonia, N.C., assignors to Fiber Controls Corporation, Gastonia, N.C.

Filed Apr. 1, 1974, Ser. No. 456,981
Int. Cl.² B65G *65/70*
U.S. Cl. 222—200 **5 Claims**

1. A web former for feeding fibers to a card or other subsequent textile equipment comprising:

means forming a downwardly tapered chute having a plurality of vertically extending sides forming at their upper ends an inlet opening for receiving open fibers and forming at their lower end a discharge opening of thickness smaller than said inlet opening so as to form in said chute a wedged shaped column of fibers having a given width and a downwardly tapering thickness,

means adjacent said inlet opening for introducing open fibers from a source downwardly through said tapered chute,

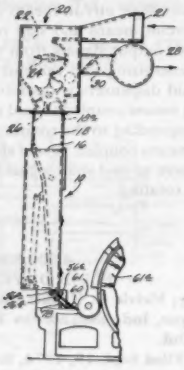
a height extending fiber chamber disposed between said introducing means and said inlet opening, said height extending chamber having a plurality of sides and having a plurality of apertures through at least one side of said chamber sides to permit removal of air while preventing the escape of fibers,

said chute forming means including a movable shaker plate as one of said vertically extending chute sides,

rotatable shaft means disposed adjacent to said movable shaker plate,

offset cam means for shaking said fiber column down throughout its height by oscillating said movable shaker plate to vary said discharge opening generally in a horizontal direction between predetermined maximum and minimum thickness dimensions, said offset cam means comprising an eccentric sleeve secured to said rotatable shaft means and concentrically rotatably journalled within a bearing assembly comprising ball bearings sealed between an inner and outer race, said sleeve being secured to said inner race so that said sleeve may be rotated with respect to said outer race,

means for adjusting said rotatable shaft means in a substantially horizontal direction relative to said shaker plate, said adjusting means enabling the bias of said movable plate against said bearing assembly to be selectively controlled and comprising at least one micrometer disposed adjacent said rotatable shaft means for selectively displacing said rotatable shaft means in a plurality of positions,



means for biasing said movable shaker plate against said bearing assembly so that when said eccentric sleeve is rotated by said rotatable shaft means, sliding contact between said bearing assembly and said movable shaker plate is substantially eliminated during oscillation of said shaker plate,

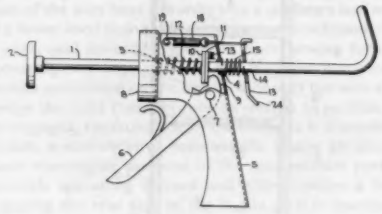
at least one of said vertically extending sides containing a plurality of apertures sized to prevent escape of fibers from said chute column while allowing the removal of air from the fiber column while said plate shakes the fibers under the urging of said offset cam means down said chute and compresses them into a compact web of uniform density and thickness available at said discharge opening and

means adjacent to said discharge opening for withdrawing a uniform web from said chute and delivering the web to subsequent textile equipment including a plurality of delivery rolls each having a longitudinally fluted outer surface and each extending substantially across the length of a formed web, each of said delivery rolls also having substantially the same circular cross section and disposed adjacent to said discharge opening while being adapted to be rotatably driven so that a web may be transported between driven delivery rolls to subsequent textile equipment.

4,009,804
ANTI-DROOL EXTRUSION DEVICE

Charles R. Costa, Plainville, and Robert L. Smigel, Middletown, both of Conn., assignors to Loctite Corporation, Newington, Conn.

Continuation of Ser. No. 484,532, July 17, 1974, abandoned. This application Mar. 18, 1976, Ser. No. 662,385
Int. Cl.² G01F *11/02*
U.S. Cl. 222—391 **4 Claims**

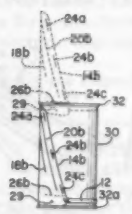


1. An extrusion device comprising: (a) a rigid frame having two opposing ends and adapted to contain an extrudable material; (b) a nozzle mounted at one end of the frame through which the material is expressed; (c) a handle mounted at the other end of the frame; (d) a plunger and push rod mounted on the handle and advanceable coaxially with the frame and adapted to compress the material thereby causing the material to be expressed; (e) a plunger-advancing means adapted to receive actuating force and transmit this force to the push rod causing the push rod and plunger to advance; and (f) a pressure-relieving means to permit the push rod to automatically move backward, when the actuating force is stopped, a distance sufficient to relieve expansion force which has been developed in the material, said pressure-relieving means comprising a generally vertical dog slidably and pivotably mounted on the push rod, the dog having a pivot point which is longitudinally movable by the opposing action of a tension spring and a compression spring, balanced against each other so as to cause the dog to alternately tilt and then resume a more nearly vertical attitude, said tension spring being connected between the handle and the dog above said pivot point, and said compression spring being mounted coaxially on the push rod and bearing against the handle and the dog.

4,009,805
POUR SPOUT

Mindaugas Julius Klygis, Barrington, and William Norfred Weaver, Glen Ellyn, both of Ill., assignors to Illinois Tool Works Inc., Chicago, Ill.

Filed Mar. 29, 1976, Ser. No. 671,512
Int. Cl.² B67D *5/06*
U.S. Cl. 222—530 **16 Claims**

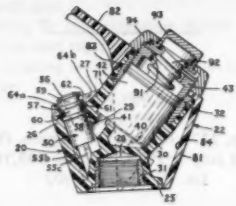


1. A spout formed from a sheet of flexible material and adapted for attachment to a complementary container; and comprising a body of generally trapezoidal shape with opposite marginal edges tapering between the smaller and wider end portions to define a pouring spout with the wider end portion including a transverse strip portion and an adjacent transverse remnant body portion adapted for permissive relative partial separation to provide a band combination for encircling an associated container body for permissive sliding therealong from retracted position with the band combination and spout portion within the ends of a container body to extended position with the spout portion projecting beyond an adjacent end of a container for permissive drawing together of the marginal edges, and interengageable attachment means adjacent opposite marginal edges for holding the said edges in inwardly drawn position reducing the size of the pouring spout at least toward the pouring exit end portion.

4,009,806
DISPENSING HEAD FOR FLUID DISPENSING SYSTEMS HAVING ELEMENTS MADE FROM PLASTIC MATERIAL

Richard C. Dreibelbis, Fair Lawn, and Warren E. Turner, Succasunna, both of N.J., assignors to Emerson Electric Co. (H & H Thermostats Div.), Cedar Grove, N.J.

Continuation-in-part of Ser. No. 536,177, Dec. 24, 1974, abandoned. This application June 18, 1975, Ser. No. 588,049
Int. Cl.² B65D *47/00*
U.S. Cl. 222—545 **7 Claims**



1. A dispensing head for a fluid dispensing system comprising,

a. a base member made from an inert plastic material having an inlet chamber in the lower section, an outlet chamber in the upper section, a control valve cavity spaced from said inlet chamber and said outlet chamber, and passage means for fluid in the base member connecting said inlet chamber to said control valve - cavity, and said control valve cavity to said outlet chamber,

b. means for connecting said base member to said fluid dispensing system and to a source of fluid to be dispensed,

c. locking guide means formed adjacent to the lower section of said base member,

d. guard means made of an inert plastic material having a connecting section and a shield section continuous therewith

e. said guard means having locking guide grooves disposed on said connecting section to engage the locking guide means on the base member,

f. stop means on the base member to maintain the guard member in predetermined assembled position,

g. and means for holding said base member and said guard member in assembled position.

4,009,807
GARMENT HANGER

Herb Coon, New York, N.Y., assignor to Red Wing Products Inc., New Hyde Park, N.Y.

Filed Dec. 11, 1975, Ser. No. 639,703
Int. Cl.² A47J *51/14*
U.S. Cl. 223—96 **11 Claims**

1. A hanger comprising

an elongated cross-bar having an offset portion at each end;

a hook disposed at an intermediate part of said cross-bar; and

a pair of clips mounted on said cross-bar, each said clip

being disposed at a respective end of said cross-bar and including a first jaw integrally formed on a respective offset portion of said cross-bar, a second jaw mounted on said first jaw in abutting pivotal relation to said first jaw, each jaw of each clip including a gripping means at one

end facing an opposed gripping means of the other jaw of each clip, said oppositely disposed gripping means being located symmetrically of the plane of said cross-bar and a spring biasing said jaw together, said spring being disposed to straddle said jaws.

4,009,808

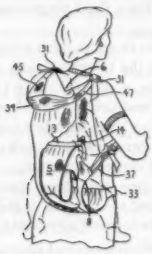
BABY PACK

Andrea H. Sharp, 2276 Kincaid St., Eugene, Oreg. 97405

Filed July 7, 1975, Ser. No. 593,766

Int. Cl.² A47D *13/02*

U.S. Cl. 224—6 **7 Claims**



1. In combination, a shoulder supported child carrier, including an outer jacket having a front member and a back member;

a shoulder harness including first shoulder strap means having strap retaining means thereon, said strap means connected to the front member of the carrier;

plural loop means on the back member;

second shoulder strap means on the front member adapted to pass through the loop means and engage the strap retaining means;

wherein the improvement comprises:

a removable inner seat attached to the jacket comprising a wide upper portion having a strap attached thereto, a narrow center portion and a lower portion tapering from the narrow center to a wide bottom, the wide upper portion adapted to provide support to the back of a child carried within the seat and the narrow center and wide bottom defining means for adjusting the seat width to provide support for the lower back and buttocks of children of differing sizes, said adjusting means also comprising a plurality of seams securing the bottom of the seat to the outer jacket, said seams being selectively removable when the seat is adapted to hold a larger child.

4,009,809

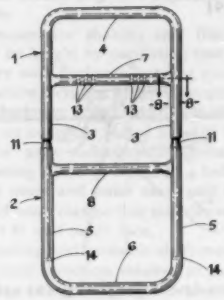
BACK-PACK FRAME

Lowell H. Morris, Dixon, Calif., assignor to Morris Manufacturing Company, Dixon, Calif.

Filed May 5, 1975, Ser. No. 574,358

Int. Cl.² A45F *3/10*

U.S. Cl. 224—25 A **1 Claim**



1. In a back-pack frame comprising a pair of initially separate, one-piece, substantially U-shaped members formed of tubing, said members being disposed in end-to-end facing relation, the outer end portions of the tubular legs of one member being of reduced outside diameter and telescopically engaged in the outer end portions of the tubular legs of the other member, elements connecting said telescoped leg portions, and cross bars spanning in engaged relation between and supported by the legs of said members, the cross bars having tongues projecting from their ends, the legs having corresponding slots into which the tongues extend, the cross bars end-abutting the legs when the tongues extend into said corresponding slots, and the cross bars being of a length between the tongues to space the related legs in parallel; the characteristic improvement comprised of of the legs of the individual members initially coonverging sightly toward the outer ends thereof, said intially converging legs of the members first being spread apart beyond parallel to permit primary insertion of the tongues of the cross bars into the corresponding slots in the legs, and then said legs are permitted to spring back, as limited by the cross bars, to said parallel position whence the tongues fully seat in the slots, the outer end portions of the legs of said members then being telescopically engaged and connected by said elements.

4,009,810

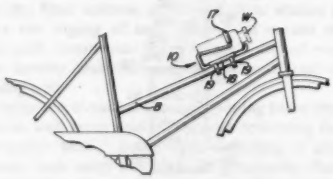
WATER BOTTLE CAGE

William Blair Shook, Rochester, N.Y., assignor to Thurston, Inc., Columbus, Ohio

Filed Dec. 12, 1975, Ser. No. 640,018

Int. Cl.² B62J *11/00*

U.S. Cl. 224—39 **2 Claims**



1. A cage for a water bottle or the like comprising a single piece of resilient wire bent to form a bottle-receiving and retaining socket consisting of the following: an upstanding rear retaining portion of inverted U-form which has an upper

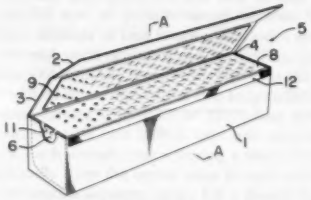
catch portion of eye-form angled forwardly of a pair of legs which converge toward each other in a common plane to lower portions almost in contacting relationship which have forwardly-extending and slightly downwardly-inclined arms which diverge laterally; an inverted U-form forward retaining portion extending upwardly from said inclined arms in forwardly-spaced relationship to the rear retaining portion and inclined rearwardly toward said portion being of lower height than the rear retaining portion and provided with a pair of upstanding rearwardly-inclined legs having the respective ends of the wire bent inwardly into a common horizontal plane at a lower level than said catch portion to substantially meet at a joint, said inwardly bent wire ends bowing forwardly in a forwardly-converging arc; a non-abrasive non-metallic tube section positioned on the arms to connect the wire ends and to bridge the joint therebetween as well as to provide a bumper for engaging the front side of the bottle as it is inserted into the socket; a non-abrasive non-metallic sleeve mounted on said lower converging portions of the rear retainer portion which prevents spreading thereof and also provides a bumper for engaging the rear side of the bottle as it is inserted into the socket.

4,009,811

VENTS-MAKING DISPENSER CARTON

Hiromitsu Takai, Building, 4-12 3-chome, Rm. 202 Daiichi Takai, Shimbashi Minato, Tokyo 105, Japan

Filed Mar. 10, 1975, Ser. No. 556,936
Int. Cl.² B26F *1/00, 3/02*
U.S. Cl. 225—7 **8 Claims**



1. In a disposable dispenser carton for the simultaneous dispensing of flexible wrapping sheet materials and the foraminous perforation of selected portions thereof, the improvement comprising:

A. a blank of rigid foldable material, said blank having at least five parallel segments, which when folded laterally inwardly at right angles relative to each other form a carton of rectangular cross-section, one of said segments being in overlapping relation relative to a second said segment, the said one segment bearing plural projections in a preselected pattern and the said second segment of similar pattern defining means which are responsive to perforate action of the said projections of the said first segment therein for intermittent engagement by the projections in the alternate dispensing and perforation of the sheet material;

B. and means securing the respective folded segments into rigid position.

4,009,812

FIBRILLATOR

Herbert W. Keuchel, Tallmadge, and George A. Farris, North Canton, both of Ohio, assignors to PNC Corporation, Wycoff, N.J.

Filed Oct. 3, 1975, Ser. No. 619,313
Int. Cl.² B26F *3/02*
U.S. Cl. 225—97 **8 Claims**

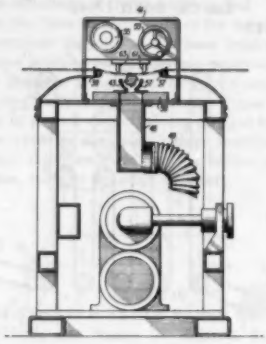
1. A mechanical fibrillator for use in a slit film tape extrusion system comprising

means for guiding said tape through said fibrillator;

a rotating cutter rod mounted in said fibrillator;

a plurality of cutting edges extending along the length of said rod;

means for forcing said tape into contact with said rotating cutting edges;



means adjacent said cutter rod for collecting dust created during fibrillation;

said rod having its axis extending across the direction of movement of said tape; and

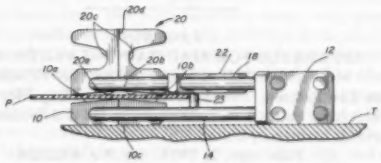
a motor for rotating said rod in the direction of movement of said tape.

4,009,813

APPARATUS FOR CRACKING PLASTIC SHEET

Thomas A. Insolio; Daniel W. Patterson, both of Bristol, and Vincent T. Kozyrski, New Britain, all of Conn., assignors to The Fletcher-Terry Company, Farmington, Conn.

Filed Oct. 24, 1975, Ser. No. 625,372
Int. Cl.² B26F *3/00;* **C03B** *33/02*
U.S. Cl. 225—103 **7 Claims**



1. Apparatus for manually cracking plastic sheet material along a line of score, and comprising:

a. an anvil having a convex upper face of V-shaped configuration, and having a lower face adapted to rest on a worktable or the like,

b. a breaker head having a concave lower face of V-shaped configuration complementing said V-shaped anvil face,

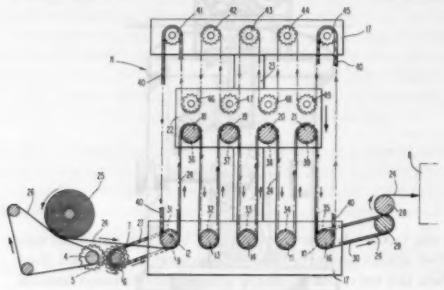
c. means supporting the anvil and head so that they are normally spaced from one another by an amount at least sufficient to accommodate the plastic sheet to be broken therebetween,

d. said supporting means including a block with a lower face also adapted to rest on the worktable, and upper and lower arms connecting said block to said head and anvil respectively, said arms being parallel to one another, and said upper arm being resilient to permit movement of said head toward said anvil in response to a downward force applied to said head.

4,009,814
WEB ACCUMULATOR

Balbir Singh, Media, Pa., assignor to Scott Paper Company, Philadelphia, Pa.

Filed Sept. 8, 1975, Ser. No. 611,064
Int. Cl.² B65H 17/42
U.S. Cl. 226—113 8 Claims



1. A web accumulator for accumulating and discharging a reserve portion of a continuous web passing through the accumulator in order to compensate for the difference between an inlet speed and an outlet speed of the web, the accumulator comprising:

first and second sets of rotatably mounted web rolls, each of which is partially wrapped by the web when the web is looped alternately from a roll of the first set to a roll of the second set in consecutive order, the second set of rolls being mounted for movement with respect to the first set of rolls;

means responsive to the inlet and outlet speed of the web for moving the second set of web rolls towards the first set of web rolls to discharge the reserve portion of the web when the outlet speed exceeds the inlet speed and for moving the second set of web rolls away from the first set of web rolls to accumulate the reserve portion of the web; and

web roll drive means separate from the web for rotating each roll at the speed of the web portion in contact with it when discharging and accumulating the reserve portion of the web.

4,009,815
APPARATUS FOR MAINTAINING VERTICALLY MOVING STRIP AT ESTABLISHED TENSION

Ivan Leo Ericson, Towanda, and James Elroy Morean, Coudersport, both of Pa., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Filed Apr. 2, 1976, Ser. No. 672,850
Int. Cl.² B65H 17/42
U.S. Cl. 226—113 7 Claims

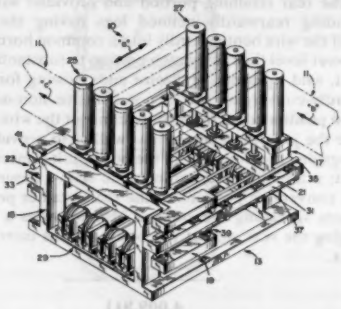
1. An apparatus for maintaining a verticallyoriented moving strip of relatively thin and flexible metallic material at an established tension to prevent deformation thereof, said apparatus comprising:

a frame having first and second opposingly positioned upright members and first and second spacedly positioned brace members, each of said brace members interconnecting said first and second upright members;

a movable carriage adapted for moving between said upright members in a reciprocative manner along a substantially horizontally aligned path;

first and second substantially horizontally aligned guide means spacedly positioned on said frame in a substantially parallel relationship for guiding said movable carriage during said reciprocative movement, each of said guide means comprising a pair of shaft members, said pair of shaft members of said first guide means secured to opposing sides of said first brace member of said frame, said pair of shaft members of said second guide means secured to opposing sides of said second brace member of said frame;

first and second opposing series of vertically-oriented rollers for positively engaging said moving metallic strip to effect circuitous movement of said metallic strip therebetween, said first series of rollers positioned on said movable carriage and extending thereabove, said second series of rollers positioned on said second upright member of said frame; and

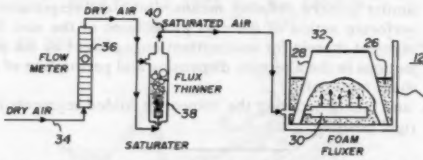


motion means located below said first and second series of rollers for imparting motion to said movable carriage to accomplish said reciprocative movement and maintain said metallic strip at said established tension.

4,009,816
METHOD AND APPARATUS FOR INCREASING EFFICIENCY OF A FOAM FLUXER USED IN WAVE SOLDERING OF PRINTED WIRING BOARDS

Robert B. Feuchtbaum, Rockaway, and Fredrick C. Disque, Westfield, both of N.J., assignors to Alpha Metals, Inc., Jersey City, N.J.

Filed Sept. 2, 1975, Ser. No. 609,227
Int. Cl.² B23K 1/08; H05K 3/00
U.S. Cl. 228—207 7 Claims

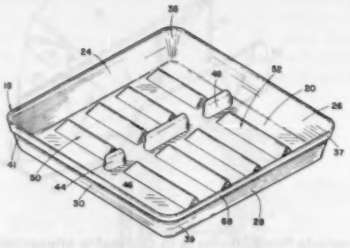


1. A method of foam fluxing a wiring board which is to be wave soldered comprising the steps of supplying a foam fluxer, filling said foam fluxer with a quantity of flux solvent solution, providing a source of gas, saturating said gas with a flux thinner compatible with said solvent in said flux solvent solution, feeding said saturated gas to said foam fluxer at a rate sufficient to effect a desired degree of foaming therein and to produce a foam flux, and thereafter applying said foam flux to said wiring board whereby the temperature and specific gravity of said foam flux will remain substantially constant during subsequent wave soldering operations.

4,009,817
TRAY FOR SHIPMENT OF FROZEN ITEMS

Paul W. Marshall, Tulsa, Okla.; Harold C. Singleton, Dallas, Tex.; Clyde L. Copp, Tulsa, Okla.; Floyd L. Lankford, Tulsa, Okla., and Patsy L. George, Tulsa, Okla., assignors to Bama Pie, Inc., Tulsa, Okla.

Filed June 25, 1976, Ser. No. 700,067
Int. Cl.² B65D *1/24*
U.S. Cl. 229—2.5 R **6 Claims**

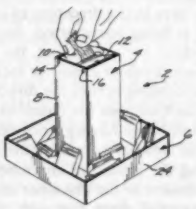


1. A tray for shipment of frozen items, comprising a bottom, a pair of opposite longitudinal sides and a pair of opposite lateral sides, each longitudinal side being connected to the lateral sides at right angles thereto, each side extending upwardly and outwardly from said bottom, a plurality of projections located along a longitudinal center line between the longitudinal sides and extending upwardly from said bottom for forming a divided partition, a first row of protuberances located between said partition and one of said longitudinal sides, a second row of protuberances located between said partition and another of said longitudinal sides opposite to the one side thereof, each protuberance extending upwardly from said bottom and laterally away from adjacent said plurality of projections to adjacent one of the two longitudinal sides, each protuberance having a long slope extending upwardly from said bottom towards one lateral side and terminating in an upper edge, each protuberance having a short slope extending almost vertically from the upper edge to said bottom whereby said tray provides a separate space for a frozen item adjoining each long slope and between said one lateral side and each adjacent short slope.

4,009,818
COMBINATION CRACKER TRAY AND WASTE CONTAINER

Jack Rogers, 6557 Costello Ave., Van Nuys, Calif. 91401

Filed Dec. 19, 1975, Ser. No. 642,673
Int. Cl.² B65D *13/04*
U.S. Cl. 229—23 R **8 Claims**



1. A combination food display storage holder and packaging waste container to hold various items, such as wrapped crackers in the storage holder and waste cracker wrappers in the waste container comprising;

a base holder member having a support surface and peripheral walls for holding food items such as crackers in a display array;

a container member having container walls extending from the support surface above the holder peripheral walls;

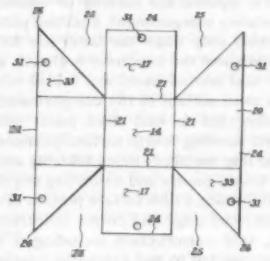
the container member adapted to receive and store waste wrappers, the holder member support surface cooperatively coacting with the container walls to provide the bottom structure of the container, and

means on the base holder member for removably attaching the container member to the base holder, to permit the container walls to be operatively positioned adjacent the holder member support surface, the container member occupying only a portion of the base holder support surface to permit the remaining portion to form a display storage area on the base holder member between the container member walls and the holder peripheral walls for items, such as wrapped crackers.

4,009,819
DISPOSABLE TABLE PAPER BASKET

Hallie E. Miller, and Nancy W. Kittrell, both of Ormond Beach, Fla., assignors to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed June 9, 1975, Ser. No. 585,045
Int. Cl.² B65D *5/42, 5/22*
U.S. Cl. 229—32 **2 Claims**



1. A paper basket sheet for use in forming a basket for the retention and removal of dining debris which basket is shaped of folded sections of a cut-out paper sheet formed with preformed creased lines and with fastening holes, said paper sheets being stackable together in the unfolded form prior to use, in which, each sheet is formed of a square outline bounded by a first pair of spaced, straight parallel first edges that are each perpendicular to a second pair of spaced, straight parallel second edges, with each sheet formed with

a first pair of parallel spaced first fold lines, each of said fold lines being equally spaced from a second first edge and an adjacent first fold line, and

a second pair of parallel spaced second fold lines, each of said second fold lines being equally spaced from a said second edge and an adjacent second crease line, with

a triangular cut-out section in each corner of the sheet, each said cut-out section bounded by a line extending from said first edge, a second fold line adjacent the said corner, and a diagonal line extending from the said corner to the intersection of said second fold line with a first fold line adjacent to said corner,

said first and second fold lines being pre-formed with crease lines along the length of such fold lines that are bounded on each side of the line by the shaped sheet,

together with six holes oriented on the sheet in two sets of three holes each, and located so that each set of three holes align with each other on one of two opposed sides of a basket formed by folding the sheet along the pre-creased fold lines to form an open basket of a cubical shape, the bottom of which is in the form of a square bordered by said first and second fold lines.

4,009,820

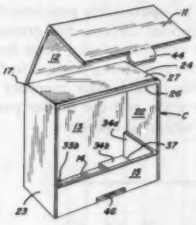
SHIPPING CONTAINER AND BLANK THEREFOR

Robert H. Fitzgerald, Lancaster, Pa., assignor to Packaging Corporation of America, Evanston, Ill.

Filed Nov. 26, 1975, Ser. No. 635,760

Int. Cl.² B65D *5/22*

U.S. Cl. 229—33 **3 Claims**



1. A shipping container for a product being formed from a single blank of foldable sheet materal comprising a first panel forming a first surface portion of a product accommodating compartment when the container is closed, a pair of flap members being folded towards one another and forming a second surface portion of the compartment, when the container is closed, and being in unfolded relation, when the container is opened for loading or unloading the product accommodating compartment, a second panel overlaying said flap members only when the latter are folded towards one another and when the container is closed, a third panel connected to said second panel and folded relative thereto and forming a third surface of the compartment, a pair of fourth panels connected to said third panel and folded relative thereto and forming fourth surface portions of the compartment, said flap members being foldably connected to corresponding fourth panels and extending angularly therefrom, a fifth panel forming a fifth surface portion of the compartment, and a reinforced edge and corner construction for the compartment; said construction including a reinforcing panel foldably connected to and extending angularly from the fifth panel, end flaps foldably connected to and extending angularly from opposite ends of said reinforcing panel, each end flap having a first section foldably connected to an end of said reinforcing panel and engaging the compartment-forming surface portion of one fourth panel, and an angularly extending second section foldably connected to said first section, and tuck flaps foldably connected to corresponding ends of the fourth panels and extending angularly therefrom, said tuck flaps being sandwiched between the fifth panel and the second sections of said end flaps, when the container is either opened or closed.

4,009,821

HOT-FOOD TRANSPORTING BOX

Thomas P. Hambleton, Kansas City, Mo., assignor to International Paper Company, New York, N.Y.

Filed Feb. 25, 1976, Ser. No. 661,314

Int. Cl.² B65D *5/22*

U.S. Cl. 229—36 **4 Claims**

1. A hot-food transporting box made of a semi-rigid material comprising

a top panel, a back panel attached to the top panel, a bottom panel attached to the back panel, and side panels attached to the top and bottom panels;

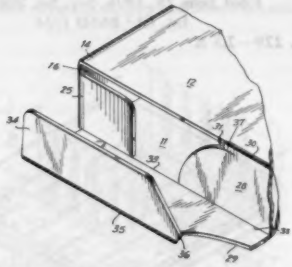
a multi-lamina front panel, the front panel comprising an inside front lamina attached by a fold line segment to a front edge of the top panel and an outside front lamina attached by a fold line segment to the front edge of the bottom panel,

the side panels attached to the top panel having inwardly folded flaps vertically oriented between the top and bottom panels,

the outside front lamina comprising tabs,

portions of the inside front lamina, of the front edge of the top panel, and of the flaps defining an opening adjacent each side panel of the box,

the tabs being folded inwardly into the openings, whereby



the outside front lamina is in releasable engagement with the inside front lamina, and

the inside front lamina contacts the bottom panel, whereby this contact retards sagging of the top panel due to any heat and moisture generated from hot food contained in the box.

4,009,822

WEIR IN A PATH OF CONVEYANCE

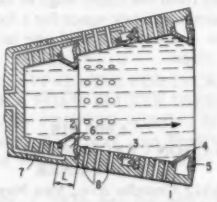
Hans Zürrer, Esslingen, Switzerland, and Martin Baram, Brondby Strand, Denmark, assignors to Escher Wyss Limited, Zurich, Switzerland

Filed Aug. 26, 1975, Ser. No. 607,884

Claims priority, application Switzerland, Sept. 2, 1974, 011888/74

Int. Cl.² B04B *11/04*

U.S. Cl. 233—3 **4 Claims**



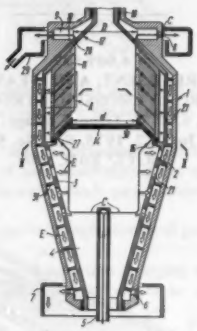
1. The combination of an upwardly open path of conveyance which declines in the direction of conveyance and along which material is being transported, and a weir apparatus for selectively blocking such transport, the weir apparatus comprising a pressure medium chamber located at the bottom of said path and extending across the direction of transport; and a membrane which overlies the chamber and seals it from said material, the membrane having a position of repose, in which it lies along the bottom of said path and permits material movement along the path, and an arched position to which it is moved by pressure in the chamber and in which it impedes transport of material along the path, the membrane having two successive parts in the direction of transport which are so arranged that, in said position of repose, the upstream part overlies the downstream part and effectively isolates it from the material being transported, and, in said arched position, the upstream part faces in a direction opposite to the direction of transport, whereby material overlying the membrane when the latter is arched is urged in the upstream, rather than the downstream direction.

4,009,823

BOWL OF SOLIDS-CONCENTRATION CENTRIFUGE

Andrei Stepanovich Nozdrovsky, Krasnaya ulitsa, 50, kv. 29, Leningrad, U.S.S.R.

Filed Nov. 12, 1975, Ser. No. 631,031
Claims priority, application U.S.S.R., June 25, 1974, 2032423
Int. Cl.² B04B 3/04
U.S. Cl. 233—7 4 Claims



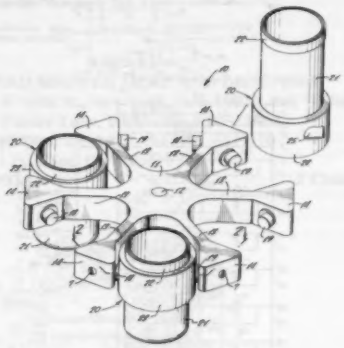
1. A bowl of a solids-concentration centrifuge comprising a hollow case having opposed ends and being formed at the region of one of said ends with outflow openings for clarified liquid and at the region of the other of said ends with discharge openings for the discharge of a cake, said case having a central axis, and a scroll situated coaxially within said case and including a quill and a screw extending outwardly from said quill to the region of an inner surface of said case, said quill having at the region of said discharge openings of said case an inlet for receiving a slurry which is centrifuged, and said quill having an interior hollow bore, a stack of separating discs situated in said hollow quill bore of said scroll at the region of said outflow openings of said case, said stack of separating discs each having the configuration of a truncated cone and each having inner and outer peripheral edges, spacers situated between said separating discs to maintain them spaced from each other so that said discs define between themselves clearances in which slurry is centrifuged, said discs being formed at the region of their outer peripheral edges with holes extending inwardly from the outer edges of said discs for placing all of the clearances between the discs in communication with each other so as to enable the slurry which is centrifuged to pass from said bore of said quill of said scroll into said clearances, said quill having an inner surface directed toward said stack of discs and provided with radial projections extending from said inner surface of said quill into engagement with said outer peripheral edges of said discs for positioning the latter coaxially within said quill of said scroll, and said quill of said scroll being formed with quill holes passing through said quill for placing a space defined between said quill and case in communication with the interior bore of said quill so as to allow the cake to discharge through said quill holes into said space between said quill and case, said quill holes being situated at the region of the interior bore of said quill which is occupied by said stack of separating discs and said quill holes also being situated between said radial projections of said quill.

4,009,824

SWINGING BUCKET CENTRIFUGE ROTOR

Herschel E. Wright, Santa Clara, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.

Filed Dec. 31, 1975, Ser. No. 645,813
Int. Cl.² B04B 9/12
U.S. Cl. 233—26 14 Claims



1. A centrifuge rotor comprising:
a core for mounting the rotor on a drive shaft for rotating the rotor about its axis of rotation;
a plurality of spaced arms extending radially outward from said axis of rotation, each of said arms having only a single hole formed in the outer end thereof, perpendicular to the longitudinal axis thereof; and
a trunnion pin disposed in each of said holes, each trunnion pin including a central portion and acutely oriented opposite extremities, said opposite extremities of each trunnion pin extending outwardly from said arms towards and coaxial with the outwardly extending extremities of the pins of adjacent arms to form trunnions for supporting bucket assemblies.

4,009,825

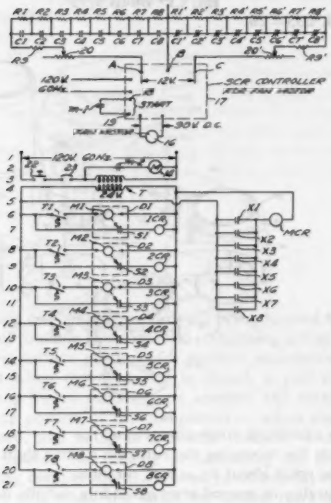
CONTROL FOR FORCED AIR HEATING OR COOLING SYSTEM

George M. Coon, Hillside House Saybrook Road, Essex, Conn. 06426

Filed Feb. 11, 1976, Ser. No. 657,110
Int. Cl.² F24F 3/02
U.S. Cl. 236—1 E 14 Claims

1. In a forced-air heating or cooling system having a plurality of thermostats for different areas, a plurality of dampers which are automatically controlled individually by said thermostats to regulate the delivery of heated or cooled air to the corresponding areas, heat exchange means for heating or cooling the air to be supplied to said dampers, a variable speed motor-driven fan for passing heated or cooled air from said heat exchange means to said dampers, an electrical controller for the fan motor having a potentiometer with a plurality of resistors therein for controlling the speed of the fan motor in accordance with the potentiometer output voltage, and a plurality of control relays each operatively associated individually with a respective thermostat for operation in response to the operation of the corresponding thermostat, the improvement wherein:
said control relays have respective sets of contacts which are connected respectively across different resistors in

said potentiometer to change the potentiometer output voltage each time one of said control relays is operated,



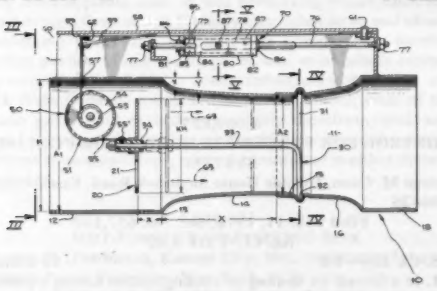
whereby to change the fan motor speed each time one of said thermostats is operated.

4,009,826

VARIABLE VALUE CONSTANT VOLUME FLOW DEVICE

Jordan E. Walker, 752 S. University Drive, Riverside, Calif. 92507

Filed Oct. 14, 1975, Ser. No. 621,733
Int. Cl.² F16K *31/12*
U.S. Cl. 236—49 **17 Claims**



1. In a constant volume fluid flow device having a body defining a flow passage with an inlet portion and an outlet portion; said body adapted to conduct a flow of fluid through said passage wherein such flow has a varying pressure at said inlet portion, a restricting member movably mounted in said passage and constant volume producing means operatively engaging said restricting member for producing a constant volume flow rate through said passage in response to varying inlet pressures, the improvement comprising:

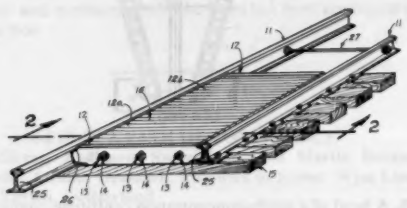
variable value means operatively engaging said restricting member for varying the setting for said constant volume flow rate from a given value of constant volume flow rate through said body to a selectively greater or lesser second value of constant volume flow rate differing from said given value by an increase of about 500% or a decrease of about 20% of control volume at any given inlet static pressure, said constant volume producing means further including biasing means engaging said restricting member for normally biasing the restricting member axially toward said inlet portion with said fluid flow forcing said restricting member axially toward said outlet portion against the action of said biasing means, said biasing means including an elongaged leaf spring having one end secured to said body and the opposite end fixedly secured to a first elongated member operatively connected to a first rotatable member mounted in said inlet portion, a second rotatable member fixed to said first rotatable member for rotation therewith, and a second elongated member fixedly secured to said restricting member.

4,009,827

FLEXIBLE, RESILIENT, AND WEAR RESISTANT RAILROAD CROSSING STRUCTURE

Leonard I. Tafel, 6345 N. Tripp, Chicago, Ill. 60646

Filed June 12, 1975, Ser. No. 586,239
Int. Cl.² E01C *9/04*
U.S. Cl. 238—8 **15 Claims**



1. A flexible and resilient crossing structure for extending a roadway across a railroad track, said structure comprising a continuous surface formed by the edges of a laminae of elongated, flexible and resilient strips secured together in a face-to-face, vertical relationship with rigid plates terminating opposite ends of said laminae, said laminae having a length equal to the width of a desired roadway, and a width equal to the space between the vertical webs of a pair of railroad rails, each strip in said laminae having longitudinal notches along at least some corners thereof so that said laminae fits snuggly between and is supported by said rails and the laminae surface is substantially flush with the tops of said rails, said laminae being free of attachment to the underlying railroad bed.

4,009,828

ORGANIC NUCLEATING AGENT FOR BOTH WARM AND COLD CLOUDS

Aaron N. Fletcher, Ridgecrest, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

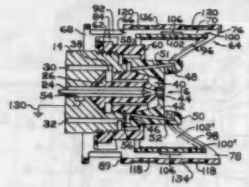
Continuation of Ser. No. 581,063, May 27, 1975, abandoned. This application Nov. 19, 1975, Ser. No. 633,191
Int. Cl.² A01G *15/00*
U.S. Cl. 239—2 R **2 Claims**

1. In a method for dispersing a fog, wherein particles of a nucleating material are distributed in said fog to cause the fog to form droplets which fall in the form of precipitation, the improvement residing in preparing and distributing as said nucleating material particles of 1,1,1-tris (hydroxymethyl) ethane, said particles being distributed in the form of droplets having diameters from about 5 to about 40 microns if the temperature is greater than minus five degrees centigrade and said particles being distributed in the form of smoke particles if the temperature of the fog is less than minus five degrees centigrade.

4,009,829
ELECTROSTATIC SPRAY COATING APPARATUS

James E. Sickles, Glenshaw, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Feb. 11, 1975, Ser. No. 548,958
Int. Cl.² B05B 5/02
U.S. Cl. 239—15 35 Claims

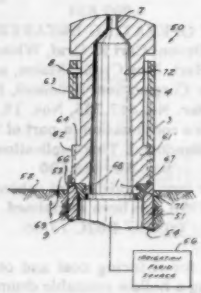


1. An electrostatic spray coating apparatus comprising:
an electrically nonconductive spray nozzle having liquid discharge ports;
induction charging means including electrode means located exteriorly of said discharge ports and defining a charging zone through which passes liquid discharged from said nozzle;
means applying a relatively high electrical potential to said electrode means;
shielding means for said induction charging means; and
means applying a reference potential to said shielding means.

4,009,830
HYDRANT CONSTRUCTION FOR A SOIL IRRIGATION SYSTEM

Ivan Stefanov Varlev, Sofia, Bulgaria, assignor to Centralna Laboratoria Za Agrophysicheski Izsledvania, Sofia, Bulgaria

Filed Apr. 21, 1976, Ser. No. 678,763
Claims priority, application Bulgaria, Apr. 24, 1975, 29806
Int. Cl.² B05B 15/10, 15/04, 1/30
U.S. Cl. 239—204 8 Claims

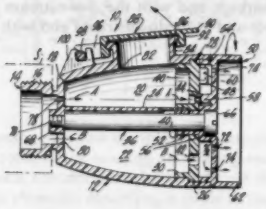


1. For use in a soil irrigation system, a soil-mounted hydrant having a vertically disposed cylindrical housing, the lower end of the housing being communicable with a source of irrigating fluid, an upper portion of the cylinder housing having aperture means disposed in the side wall thereof for externally distributing fluid introduced into the housing from the source, the housing being movable between a lower position in which the aperture means are below ground level and an upper position in which the aperture means are above ground level, and a cap positionable within the upper portion of the housing and cooperable therewith for closing the aperture means, the improvement wherein the hydrant further comprises means supporting the cap for adjustably positioning the cap in the upper portion of the housing at a desired location between the upper limit in which the aperture means are completely open and a lower limit in which the aperture means are completely closed; in which the hydrant further comprises limit means positioned in the upper portion of the cylinder above the aperture means for inhibiting upward movement of the cap when the cap is at the upper limit; and in which the cap is further provided with a central bore extending completely therethrough for selectively conveying a portion of the irrigation fluid upwardly through the cap.

4,009,831
COMBINED SHOWER HEAD AND DISPENSER

Avi Arad, 165 E. 66th St., New York, N.Y. 10022, and William Stephens, 2 Cinder Lane, Hicksville, N.Y. 11801

Filed Sept. 10, 1975, Ser. No. 611,910
Int. Cl.² B05B 7/24
U.S. Cl. 239—315 2 Claims



1. An apparatus for producing a plurality of streams of fluid from a supply of fluid and for selectively introducing a substantially equal amount of additive into each of said streams of fluid, said apparatus comprising a main body member having an upstream end and a downstream end, a fluid inlet member and means mounting said fluid inlet member on said main body member at said upstream end thereof, said fluid inlet member including means being constructed and arranged for attachment of said apparatus to a source of supply of fluid, a fluid chamber located within said main body member and having an upstream end and a downstream end, an additive chamber located within said main body member and having an upsteam end and a downstream end, an axially extending dividing wall within said main body member at least partially defining said additive chamber and said fluid chamber, said upstream end of said fluid chamber and said upstream end of said additive chamber each being in communication with the interior of said fluid inlet member, an access member being mounted relative to said main body member and including means being constructed and arranged to permit communication with the interior of said additive chamber from the exterior of said main body member for use in introducing an additive through said access member into said additive chamber, a foraminous member mounted relative to said main body member proximate the downstream end thereof for use in producing said plurality of streams of fluid, said fluid chamber and said additive chamber each including at least one opening in the downstream end thereof, said apparatus including a mixing chamber proximate the downstream end of said main body member, said mixing chamber being in communication with said additive chamber and said fluid chamber through, respectively, said additive chamber and fluid chamber downstream end openings, said mixing chamber also being in communication with said foraminous member, said apparatus including means being constructed and arranged to define a fluid path from said fluid inlet member through said fluid chamber and into said mixing chamber, said apparatus further including means being constructed and arranged to define an additive path from said fluid inlet member through said additive chamber and into said mixing chamber, said apparatus including means being constructed and arranged to thoroughly mix said fluid and said additive in said mixing chamber and said apparatus further including additive control means

located in said additive path for selectively interrupting the flow of additive from said additive chamber along said additive path thereby selectively permitting passage of substantially only said fluid through said foraminous member and selectively permitting passage of a thoroughly dispersed mixture of said additive and said fluid through said foraminous member, a cap member mounted within said main body member so as to be relatively stationary with respect thereto and including means being constructed and arranged for at least partially closing the downstream end of both said fluid chamber and said additive chamber, said cap member including at least one fluid chamber exit port having an upstream end and a downstream end, said fluid chamber exit port being constructed and arranged to communicate at its upstream end with the downstream end of said fluid chamber and at its downstream end with said mixing chamber, said cap member further including at least one additive chamber exit port having an upstream end and a downstream end, said additive chamber exit port being constructed and arranged to communicate at its upstream end with the downstream end of said additive chamber and at its downstream end with said mixing chamber.

4,009,832

IRRIGATION MEANS FOR THE UNIFORM DISTRIBUTION OF LIQUID

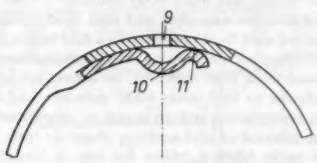
Uwe Tiedt, Karlstrasse 14, 7550 Rastatt, Germany

Filed July 30, 1975, Ser. No. 600,722

Claims priority, application Germany, Aug. 6, 1974, 2437730

Int. Cl.² B05B *15/00*

U.S. Cl. 239—542 **11 Claims**



1. Irrigation means for the uniform distribution of a controlled quantity of liquid comprising a tube for receiving the liquid under pressure, said tube having a plurality of outlet apertures spaced lengthwise thereof, a flexible baffle strip arranged within said tube to underlie said apertures, said baffle strip extending lengthwise of said tube and being attached thereto at only one longitudinal side thereby forming an elongate flap, said flap having a first longitudinally extending portion containing said one attached longitudinal side and which extends up to and beneath said apertures and a second longitudinally extending portion containing a free opposite longitudinal side and which projects beyond said outlet apertures, said flap being spaced so as to conform generally to the cross-sectional contour of said tube so that said projecting second flap portion makes contact with said tube to define therewith a throttle gap through which the liquid flows to reach said outlet apertures, said throttle gap producing a flow resistance which is governed by the pressure of the liquid received in said tube.

4,009,833

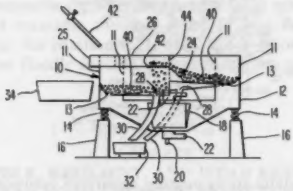
SCRAP BATTERY PLATE RECLAIMING PROCESS

Terry D. Litt, Bay Village, Ohio; Richard C. Shelton, Whittier, Calif., and Earl J. Colwell, Willowick Lake, Ohio, assignors to ESB Incorporated, Philadelphia, Pa.

Filed Aug. 14, 1975, Ser. No. 604,730

Int. Cl.² B02C *17/08*

U.S. Cl. 241—14 **7 Claims**



4. A scrap battery reclaiming process for separating scrap battery plates into metallic and non-metallic materials and for reducing the non-metallic material to particles of approximately 500 microns largest diameter or smaller which comprises:

a. placing scrap battery plates comprising metallic and non-metallic materials into a trough, the trough being resiliently mounted, having a gradual upward slope from a feed end to a discharge end and being provided with non-metallic material discharge means in the bottom thereof;

b. vibrating the trough whereby the scrap battery plates ascend the slope of the trough to the discharge end of the trough and all non-metallic material in the scrap battery plates is shaken free from the metallic materials of the scrap battery plates, is reduced to particles of approximately 500 micron largest diameter or smaller and is discharged through the non-metallic material discharge means in the bottom of the trough; and

c. collecting the metallic materials of the scrap battery plates at the discharge end of the trough.

4,009,834

METHOD OF OPERATING BREAKER/CRUSHER

William F. Hahn, Devon; Carl R. Graf, Whitehall, both of Pa., and George H. Hart, New Castle, Maine, assignors to Pennsylvania Crusher Corporation, Broomall, Pa.

Continuation of Ser. No. 417,335, Nov. 19, 1973, Pat. No. 3,931,937, which is a continuation-in-part of Ser. No. 267,936, June 30, 1972, abandoned. This application Oct. 28, 1975, Ser. No. 626,600

The portion of the term of this patent subsequent to Jan. 13, 1993, has been disclaimed.

Int. Cl.² B02C *13/06*

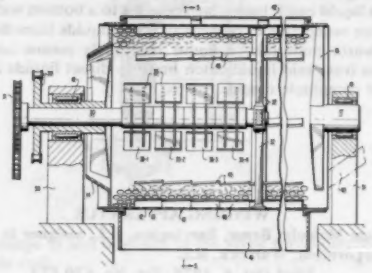
U.S. Cl. 241—27 **8 Claims**

1. In a method for reducing coal and other materials, in apparatus including a hollow rotatable drum having an opening therein to receive feed material and wall means including screening openings to discharge material of desired size, lifter shelves positioned on the inner surface of said wall means for lifting and dropping material within the drum as the drum is rotated, and rotor means including a rotor shaft and shaft-mounted material impacting means positioned within at least a portion of the length of the drum for impacting material dropped from said shelves, the improvement which comprises:

a. driving said drum at a speed in the range of about 70% to about 95% of critical speed;

b. maintaining said lifter shelves on the drum at predetermined angle of inclination, ranging from 0° up to 70° in a direction opposite to the direction of drum rotation, which angle will cause said material to drop from said shelves into contact with said impacting means at or near

the crest of the orbit of the impacting means when said drum is rotated at said speed, and which will direct the material from above one side of the rotor shaft to the other side of the rotor shaft in the direction of the downrunning side of said rotor shaft; and



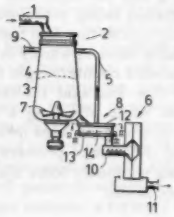
c. driving said drum and rotor in the same direction of rotation, whereby material struck by said rotor is flung against the downrunning wall of said drum.

4,009,835

PROCEDURE AND APPARATUS FOR PREPARATION OF HOT GROUNDWOOD

Ahti Syrjanen, Valkeakoski, Finland, assignor to Yhtyneet Paperitehtaat Oy Jylhavaara, Valkeakoski, Finland

Filed July 29, 1975, Ser. No. 600,093
Claims priority, application Finland, Apr. 4, 1975, 751016
Int. Cl.² B02C *7/02*
U.S. Cl. 241—28 **1 Claim**



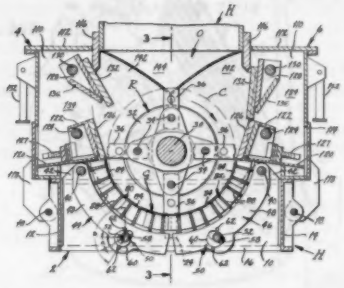
1. In a continuous process for preparing hot groundwood from wood chips wherein the chips are preheated at a temperature in a steam chamber in excess of 100° C; transporting the preheated chips through steam-preheated compartments of a sealing feeder, having a rotor, to a hot grinder by means of a feeding conveyor; the improvement which is comprised in that the steam is conducted back from the grinder through the feeding conveyor to the sealing feeder in a flow direction opposite to that of the chip flow direction, wherein each compartment is filled with steam as it is emptied of chips, draining the steam from the sealing feeder through a steam draining aperture in the direction of rotation of the rotor, located before the feeding aperture, and through a pipe into the steam chamber, in order to uniformly meter the chip feed and the steam flow.

4,009,836

MATERIAL REDUCING MACHINE

Sven B. Strom, St. Louis, and Donald F. Graveman, St. Charles, both of Mo., assignors to American Pulverizer Company, St. Louis, Mo.

Filed June 30, 1975, Ser. No. 591,462
Int. Cl.² B02C *13/284*
U.S. Cl. 241—73 **7 Claims**



1. A reducing machine comprising: a housing having a feed opening; a rotor in the housing and having reducing elements thereon which contact material introduced through the feed opening, the elements describing a circle as the rotor revolves; first and second arcuate grate sections generally beneath the circle, the second grate section being aligned with and forming a continuation of the first grate section in the direction of rotation for the rotor, each grate section having teeth which project toward the other grate section with the teeth of the two grate sections being offset and intermeshed so as to eliminate a continuous gap between the grate sections; first and second cages supporting the first and second grate sections, respectively, each of the cages extending upwardly beneath its respective grate section and at its upper end being pivoted relative to the housing about an axis parallel to the axis of rotation for the rotor to enable the grate sections on the cages to be moved toward and away from the circle described by the reducing elements while the teeth of the two grate sections remain intermeshed; and adjusting means for moving the grate sections toward and away from the circle described by the reducing elements, the adjusting means comprising a shaft extended through the housing adjacent to each cage and being rotatable about an axis fixed in position with respect to the housing, cams carried by the shafts and engaged with the cages, and means for rotating the shafts in unison to cause the grate sections to elevate or depress, depending on the direction of rotation for the shafts.

4,009,837

WOOD CHIPPING APPARATUS

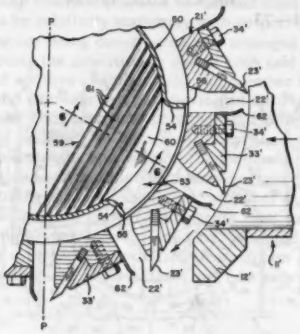
Auxilius P. Schnyder, 146 Cherry Lane, Teaneck, N.J. 07666

Continuation-in-part of Ser. No. 535,727, Dec. 23, 1974, abandoned, which is a continuation of Ser. No. 404,134, Oct. 9, 1973, abandoned. This application Nov. 20, 1975, Ser. No. 633,857
Int. Cl.² B02C *18/18, 18/22*
U.S. Cl. 241—93 **13 Claims**

1. A high speed wood chipping apparatus comprising:
a. a first drum having:
1. a closed end,
2. an open end, and
3. a plurality of circumferentially spaced wood chip receiving apertures in the peripheral surface of the drum for passing wood chips into the drum interior;
b. a plurality of circumferentially spaced wood chipping knives mounted on the drum adjacent to said apertures;
c. means for rotating the drum;
d. a second drum having:

1. an open end, and
2. shaped complementary to the shape of the first drum for positioning therein with its open end facing out the open end of the first drum;

e. means for supporting said second drum positioned within said first drum;



f. a wood chip receiving aperture in the peripheral surface of the second drum for passing wood chips received from all of the apertures of the first drum into the interior of the second drum; and

g. log feeding means for feeding logs in a cutting relation to the wood chipping knives on the first drum where they move past the wood chip receiving aperture of the second drum.

4,009,838

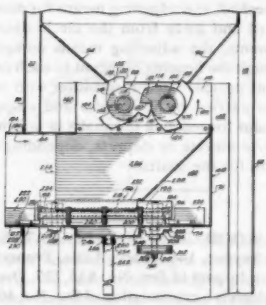
PORTABLE SOLID WASTE SHREDDER

Philip Tashman, 11020 SW. 75th Court, Miami, Fla. 33156

Filed Aug. 28, 1975, Ser. No. 608,468

Int. Cl.² B02C *13/02, 13/286*

U.S. Cl. 241—99 **17 Claims**



1. A portable waste shredder device comprising, in combination, an upstanding main shredder housing structure including a main framework defining a top charge opening means, and a discharge opening, a shredder jaw assembly comprising two sets of rotary jaws fixed, respectively, to a pair of parallel shafts, an electric motor, drive means from said electric motor to said pair of shafts for simultaneously rotating said parallel shafts in mutually opposite directions, a first chute means above said shredder jaw assembly to direct waste materials disposed in said top charge opening means into said shredder jaw assembly, a discharge opening, and means to deliver material shredded by said shredding jaw assembly through said discharge opening, said means to deliver said shredded material comprising a second chute means beneath said shredder jaw assembly, a conveyor means having a discharge run, an interior receptacle beneath said second chute means, the discharge run of said conveyor means being mounted in said interior receptacle, said conveyor means being positioned to discharge the shreds outwardly through said discharge opening, a liquid catch basin fixed relative to a bottom wall of said interior receptacle to receive all waste liquids from the shredder waste materials, a liquid receptacle means and drain means from said liquid catch basin to direct liquids into said liquid receptacle means.

4,009,839

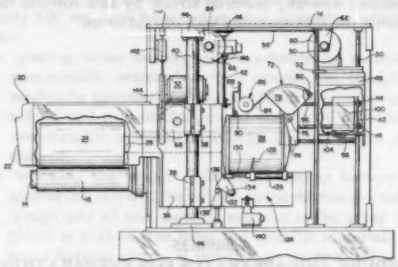
WINDING APPARATUS

William Malcolm Bense, Barrington, R.I., assignor to Leesona Corporation, Warwick, R.I.

Filed Oct. 6, 1975, Ser. No. 620,173

Int. Cl.² B65H *54/42*

U.S. Cl. 242—18 DD **13 Claims**



1. Apparatus for winding an advanced strand into a package comprising, fixed position take-up means, strand traversing means for guiding said strand to said take-up means, surface drive means for driving said take-up means to wind up the strand into a package thereon, a carriage supported for free vertical movement from an initial lower position at initiation of package winding to an upper terminal position at the completion of winding said package, both said traversing means and said drive means being positioned above said take-up means on said carriage so that said traversing means and said driving means freely move upwardly as the package increases in size, and suspended counterweight means for counter balancing said carriage and said traversing and drive means mounted thereon while affording a constant substantially uniform force urging said package into engagement with said drive means, and differential pressure means for applying a gradually reducing secondary force upon said package as said package increases in size.

4,009,840

BLAST NOZZLE FOR ROTATING TEXTILE COILS

Herbert Müller, Monchen-Gladbach, Germany, assignor to W. Schlafhorst & Co., Monchen-Gladbach, Germany

Filed May 13, 1975, Ser. No. 577,115

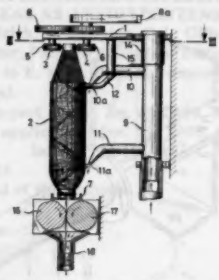
Claims priority, application Germany, May 15, 1974, 2423493

Int. Cl.² B65H *54/22*

U.S. Cl. 242—35.6 E **5 Claims**

1. Blast nozzle assembly for pneumatically loosening thread ends of rotating textile coils comprising a blast nozzle, means for transporting a textile coil past said blast nozzle in a given travel direction, means for pivotally mounting said nozzle, and

means for controlling pivoting movement of said nozzle in accordance with the travel of the textile coil within a limited



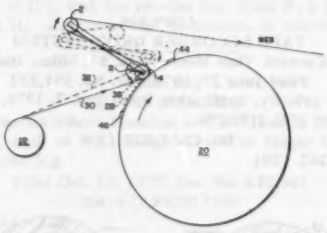
angular range in and opposite to the given travel direction of the textile coil.

4,009,841

MANUAL FLYING PASTER

Harshad D. Matalia, Easton, Pa., assignor to American Newspaper Publishers Association, Inc., Easton, Pa.

Filed Oct. 6, 1975, Ser. No. 620,663
Int. Cl.² B65H *19/10, 19/20*
U.S. Cl. 242—58.3 **2 Claims**



1. In small printing presses of the type having full paper rolls and press rollers on the same level and including a rollstand for supporting a pair of paper rolls in respective forward and rearward horizontal positions, said rollstand further comprising a frame carrying a horizontally disposed press roller above and between the forward horizontal paper roll position and the rear horizontal paper roll position, the improvement of a manual flying paster which further comprises:

A. a cradle horizontally pivotable about an axis on said rollstand frame, said axis being below said press roller and both above and between full paper rolls at said forward and rear paper roll positions wherein;

B. said cradle further includes a forward and a rear paster roller said forward and rear paster rollers being mounted parallel to said axis and thereby respectively pivotable into contact with a full paper roll in said respective forward and rear paper roll positions; and,

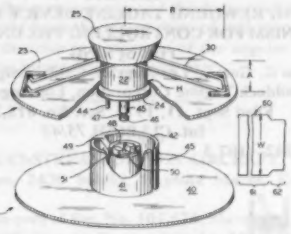
C. a trailing web cut-off means comprising a taut wire and means on said cradle for mounting said taut wire for manual pivotal movement about said forward paster roller, said taut wire extending in skewed relation to the plane of said forward and rear paster rollers, said manual flying paster being adapted to initially receive a web from a full paper roll at said rear paper roll position, wherein said web travels forwardly to beneath, and then upwardly around, said forward paster roller, then rearwardly to beneath, and then upwardly around, said rear paster roller, then forwardly and over said existing press roller to subsequent press operations, whereby said trailing web cut-off means around said forward paster roller is operable to cut off a trailing web from an expiring paper roll at either of said forward or rear paper roll positions.

4,009,842

SELF-ADJUSTING REEL

Thomas J. Persha, Juneau, and David Jagielski, West Bend, both of Wis., assignors to Bell & Howell Company, Chicago, Ill.

Filed Jan. 30, 1976, Ser. No. 653,820
Int. Cl.² B65H *75/18*
U.S. Cl. 242—71.9 **8 Claims**



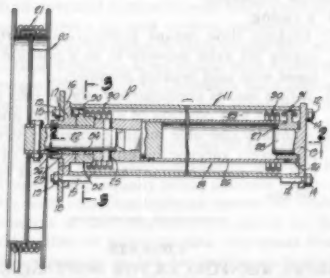
1. An automatically self-adjusting reel having two parts, one of said two parts comprising a first central hub section having a reel flange floatingly supported thereon, to move over the length of and between limit stops formed on opposite ends of the first central hub section, at least a parallel wire spring extending from the top of the first hub section outwardly toward the floating flange for biasing it at four points to urge it to move toward a flange formed on the other of said two parts, said spring extending outwardly from said hub for a distance substantially greater than the diameter of said hub to uniformly apply balanced forces against said flange.

4,009,843

SPRING REWOUND TAGLINE DEVICE WITH SPRING OVERLOAD PREVENTING MEANS

Secundino G. Gomez, Los Angeles, Calif., assignor to McCaffrey-Ruddock Tagline Corporation, Los Angeles, Calif.

Filed Sept. 11, 1975, Ser. No. 612,330
Int. Cl.² B65H *75/48*
U.S. Cl. 242—107 **7 Claims**



1. In a spring-loaded tagline rewind device for mounting on a boom, wherein a rotatable cable reel has a shaft extending axially from the cable reel and a coiled spring arranged surrounding the shaft and having one of its ends connected to the shaft by an anchor means, and with its other end connected with a fixed structure by an anchor means, the improvement being to prevent excessive loading from damaging the spring, the improvement comprising:

one of said anchor means being releasable in response to the load stresses on the spring reaching an increased predetermined magnitude, said anchor means comprising:

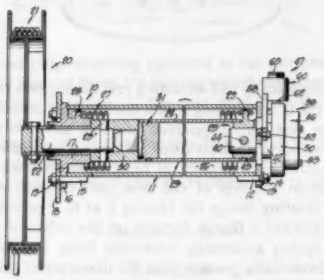
a. means confining the associated spring end to movement in a circular path;
b. fixedly mounted stop means in said circular path normally opposing the movement of said spring end in said circular path;
c. said stop means including means responsive to a predetermined load stress on the spring and against said stop means for inactivating said stop means with respect to its opposition to the movement of said spring end in said circular path.

4,009,844

SPRING REWOUND TAGLINE DEVICE HAVING A MECHANISM FOR CONTROLLING THE UNWINDING OF THE SPRING

Secundino G. Gomez, Los Angeles, Calif., assignor to McCaffrey-Ruddock Tagline Corporation, Los Angeles, Calif.

Filed Sept. 11, 1975, Ser. No. 612,331
Int. Cl.² B65H *75/48*
U.S. Cl. 242—107.3 **7 Claims**



1. In a spring rewound tagline device in which a rotatably mounted tagline reel is activated in a rewind direction by a tensioned torsion coiled spring:
mechanism for controlling the rewinding actuation of the reel by the unwinding action of the torsion spring, when the outer load connection end of the tagline is detached, said mechanism, comprising:
a. a braking member connected for rotation with the reel; and
b. a braking device assembly supported on the tagline device including:
1. a casing;
2. braking shoe means guidingly supported by said casing for axial movement to a position in engagement with said braking member;
3. spring means continuously urging said shoe means towards said position of engagement; and
4. manually operable means carried by said casing for selectively varying the effective force of said spring and the concommitant braking effect by said shoe means.

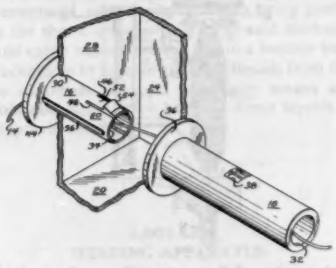
4,009,845

UNREEL REINFORCER FOR DISPENSING WIRE

Kenneth E. Santucci, 526 North Edgewood, LaGrange, Ill. 60185, and Donald G. Santucci, 1685 Shelly Lane, Wheaton, Ill. 60187

Filed Sept. 24, 1975, Ser. No. 616,293
Int. Cl.² B65H *49/00*
U.S. Cl. 242—129.7 **14 Claims**

1. A support for use in winding and dispensing a winding of flexible material comprising;
a first tubular member;
a second tubular member telescoped over the first tubular member;
means for interlocking said tubular members; and
said interlocking means comprising a pair of first slots formed in a diametrically opposed relationship on said second tubular member and a pair of tangs formed in a



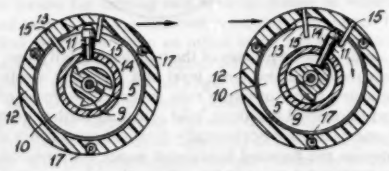
diametrically opposed relationship on said first tubular member, said tangs being separably engageable with the first slots for interlocking connection.

4,009,846

TAPE RECORDER DRIVE SYSTEM

Orlando Coruzzi, Viale Monte Nero, 57, Milan, Italy

Filed June 27, 1975, Ser. No. 591,232
Claims priority, application Italy, Jan. 7, 1974, 24678/74, Mar. 26, 1975 21706/75
Int. Cl.² G03B *1/04*
U.S. Cl. 242—201 **7 Claims**



1. In a drive, particularly for use with magnetic tapes in small size recorders, with a recorder frame, a capstan member which drives the magnetic tape in the recording and playing modes of the recorder, pulleys, a reversible electric motor and drive belts continuously connecting said reversible motor to said pulleys and to said capstan member: a pair of shafts supported by said recorder frame, two spindles wherearound the magnetic tape coils and decoils, said shafts being pivotally connected with said spindles to allow selectively free idle rotation of said shafts with respect to said spindles, said pulleys fixedly connected to said shafts, ; means engaging for rotation each of said shafts with a respective one of said spindles when said respective spindle rotates in the same direction as the tape being wound around said respective spindle, and a friction clutch device arranged between said respective spindle wherearound the tape is wound in the recording and playing modes and said means for engaging said respective spindle to its respective shaft, said clutch device having locking members adapted to prevent the free idle rotatory relationship between said respective spindle and its respective shaft when said respective spindle is rotated faster for a quick winding of the tape.

4,009,847
1-TERTIARY-ALKYL-3-(SUBSTITUTED THIENYL)UREAS AND 1-TERTIARY-ALKYL-3-(SUBSTITUTED THIETYL)UREAS AS ANTIHYPERTENSIVE AGENTS

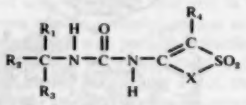
Paul Edward Aldrich, Wilmington, Del.; Gilbert Harvey Berezin, West Chester, Pa., and Bruce Ivor Dittmar, Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 461,699, April 17, 1974, abandoned. This application Mar. 11, 1975, Ser. No. 555,307

Int. Cl.² A01N 9/00

U.S. Cl. 424—275 **15 Claims**

1. A compound of the formula:



where

R_1, R_2 and R_3 are C_1–C_3 alkyl, or C_2–C_3 alkenyl, with the provisos that the total number of carbon atoms of R_1 plus R_2 plus R_3 does not exceed 5

X is $-CH_2CH_2-$ or $-\underset{\displaystyle CH_3}{\underset{|}{CH}}-CH_2-$;

R_4 is H or CH_3 with the proviso that when R_4 is CH_3, X is $-CH_2CH_2-$; and its sodium, potassium, or calcium salts.

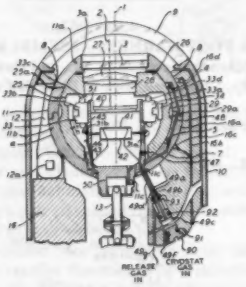
4,009,848
GYRO SEEKER

William Charles Albert, Boonton, and Bart Joseph Zoltan, Old Tappan, both of N.J., assignors to The Singer Company, Little Falls, N.J.

Filed Oct. 15, 1975, Ser. No. 622,561

Int. Cl.² F41G 7/00

U.S. Cl. 244—3.16 **9 Claims**



1. A two degree of freedom wide angle gyro seeker for use with a cannon launched missile which missile includes a nose section adjacent to a fixed base portion comprising:

a. a housing having a transparent dome shaped window at its forward end for admitting radiation and adapted to be positioned over the nose section of a missile;

b. a platform disposed for angular movement, mounted in said housing;

c. an optical assembly having a longitudinal optical axis;

d. a gyro carrying said optical assembly mounted interiorly of said platform and positioned behind said window, the rotor of said gyro establishing a spin axis about said optical assembly;

e. a detector mounted rearwardly of said optical assembly, said detector being positioned in coaxial alignment with the spin axis of said gyro;

f. means for maintaining said optical assembly with its longitudinal optical axis perpendicular to the plane of said detector while moving said platform through its angular limits; and

g. means for displacing said optical assembly's optical axis a predetermined distance from but parallel with said gyro spin axis so that as the rotor rotates, an image of a target is formed on the detector plane that describes a path the locus of which is a circle and the radius of which circle is dimensionally equal to the displacement of the optical axis from the gyro spin axis and the distance of the center of said circle from the intersection of said gyro spin axis with said detector is a measure of the angular displacement of the target from the gyro axis.

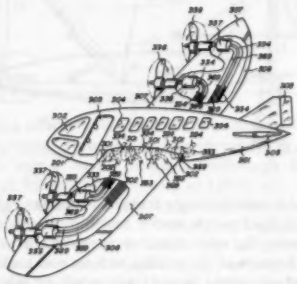
4,009,849
FLUID-STREAM DRIVEN AIRCRAFT

Karl Eickmann, 2420 Isshiki, Hayama Machi, Kanagawa, Japan

Continuation-in-part of Ser. No. 104,676, March 8, 1971, Pat. No. 3,823,898. This application July 10, 1974, Ser. No. 487,272

Int. Cl.² B64D 31/00

U.S. Cl. 244—53 R **1 Claim**



1. A fluid-stream driven aircraft, comprising, in combination, a body having an axis of substantial symmetry; pairs of hydraulic fluid-operated motors on said body; pairs of stream-creating means driven by said motors, respectively, and arranged symmetrically on opposite sides of said axis; a plurality of hydraulic fluid-flow producing means each having at least a pair of separate fluid-handling chambers each connected to one of a pair of separate outlets, and including means for fluid-tight separation of the chambers and outlets so that fluid from each chamber passes through one of said outlets only; a pair of displacement means associated with said fluid-handling chambers, respectively; equally acting actuator means cooperating equally with said displacement means for maintaining equal movements of said displacement means so that fluid flows in said outlets at proportionate and equal flow rates; pairs of delivery passage means connecting each of said outlets with a different one of said motors, respectively, whereby said stream-creating means on opposite sides of said axis are driven at equal velocities for producing equal thrusts on both sides of said axis to stabilize the movement and attitude of said aircraft, each of said fluid-flow producing means supplying a plurality of separated flows of fluid of proportionate rate of flow into a plurality of separated fluid lines; some of said plurality of fluid-flow producing means being communicated together to form a combined multiflow circuit system of a plurality of separated flows of fluid of proportionate rate of flow, and others of said plurality of fluid-flow producing means also being communicated together to form another

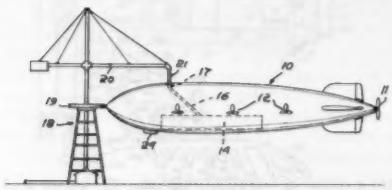
combined multiflow circuit system of a plurality of separated flows of fluid of equal rate of flow, so that said combined multiflow circuit systems may either be combined or independently operated and controlled; at least a pair of separated fluid lines of at least two of a plurality of fluid-flow producing means in each of said combined multiflow circuit systems being combined together to form respective pairs of separated common fluid lines; pairs of separated positive displacement fluid motors communicated to respective pairs of said separated common fluid lines, at least one fluid motor of each of said pairs of separated positive displacement fluid motors communicating with one of the fluid lines of the pairs of fluid lines; said combined multiflow circuit systems by connection of rotor members to the said fluid motors actuating at least two pairs of jointly or independently operable and controllable streams of fluid, wherein the streams of each pair of streams of fluid are of proportionate rate of flow; and means for preventing return flow from said separated common fluid lines to and through one or more of said fluid-flow producing means.

4,009,850

AIRSHIP TANKERS

John J. Hickey, 93 Revere St., Boston, Mass. 02114

Filed Apr. 21, 1975, Ser. No. 570,176
Int. Cl.² B64F *3/00*
U.S. Cl. 244—115 **11 Claims**



1. An airship comprising a framework, a gas tight envelope covering said framework, and a midship chamber supported by the framework, said chamber including a port opening through the bottom of the airship, at least one tank within said chamber and supported by the framework, an inlet conduit in communication with the tank, at least one flexible outlet conduit of substantial length having a normal stored position within said chamber in the form of a loop, valve controlled means connecting one end of said outlet conduit to said tank, the other end of said outlet conduit being positioned to pass through said port in response to gravity, and reversible power operated means connected to said outlet conduit and operable to pay out said outlet conduit through said port and to withdraw said outlet conduit therethrough and restore the stored position thereof, said power operated means including a winch provided with a cable, a pulley about which the the outlet conduit is trained and a yoke connecting the pulley to the cable.

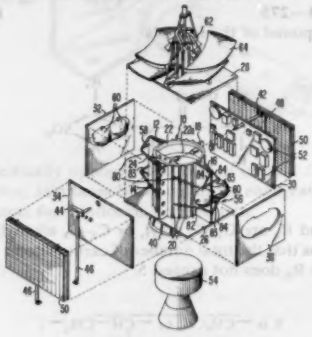
11. An airship comprising a framework, a gas tight envelope covering said framework, an upper deck, and a midship chamber including a port opening through the bottom of the airship, at least one tank within said chamber and supported by the framework, an inlet conduit in communication with the tank with its inlet end exposed in said upper deck relatively near the nose of the airship, at least one flexible outlet conduit of substantial length having a normal stored position within said chamber with one end connected to said tank, valve means in control of said outlet conduit, means operable to pay out the other end of the conduit through the port and to withdraw it therethrough, and a mooring mast including a turntable to which the nose of the airship is secured and a rotatable counterweighted boom above the turntable and of a length to extend lengthwise of the airship into a position substantially over said inlet end of the inlet conduit, and a liquid delivery conduit including a portion extending through said boom and rotatable therewith, said portion including a flexible exposed portion disposable in said inlet end.

4,009,851

SPACECRAFT STRUCTURE

Walter Lester Cable, Freehold, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Dec. 23, 1974, Ser. No. 535,810
Int. Cl.² B64G *1/10*
U.S. Cl. 244—158 **6 Claims**



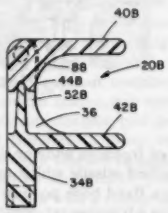
1. A spacecraft structure comprising:
an inner hollow cylindrical member, a plurality of bulkheads secured to and depending outwardly from said member, and
an outer enclosure member secured to the extended ends of said bulkheads and the ends of said inner cylindrical member to form a compartmentalized enclosed structure,
means within said cylindrical member including spacecraft engine mounting means connected to said cylindrical member for securing a spacecraft engine within said cylindrical member, said outer enclosure member including means for securing spacecraft equipment thereto and serving to provide structural rigidity to said structure while supporting said equipment.

4,009,852

CORNER POST HARNESS ASSEMBLY APPARATUS

John Jean Bulanda, New Lenox, Ill., and David Robert Schoenfeld, Sandy, Utah, assignors to Panduit Corporation, Tinley Park, Ill.

Filed Sept. 15, 1975, Ser. No. 613,383
Int. Cl.² F16L *3/22*
U.S. Cl. 248—68 R **5 Claims**



4. Harness assembly apparatus for maintaining close grouping of a plurality of flexible elongate objects such as wires as the objects make a turn and are formed into a bundle, said apparatus comprising:
retaining means of one-piece molded plastic construction for releasably holding the objects as they make a turn; and

support means of one-piece molded plastic construction adapted to be mounted on a panelboard or the like and supporting the retaining means, said retaining means comprising a first arm releasably pivotally held by said support means and movable relative thereto between a retaining position wherein said arm extends at least partially outside the turn of said bundle and a release position wherein the arm is disposed substantially inside the turn, said support means comprising a mounting base for securement to said panelboard and a pair of spaced flexible generally parallel legs extending from said base for holding said retaining means, said support means comprising a second fixed arm disposed between said first arm and said mounting base and extending generally parallel to said first arm when said first arm is in its retaining position, one of said retaining means and said support means comprising a web portion extending between said arms for engaging the bundle and defining the turn therein, and further comprising a slot, the other of said retaining means and support means comprising a cantilever beam spring extending between said legs and into said slot biasing said first arm to its retaining position whereby after the objects are formed into said bundle, the bundle can readily be removed from said apparatus after moving said arm towards its release position and, after removal of the bundle, said first arm returns toward its retaining position regardless of the mounting position of said apparatus.

4,009,853

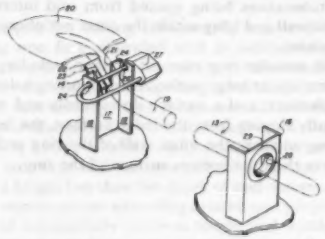
SINGLE SHOVEL HOLDER

William H. Lile, 771-6 N. Fairoaks, Sunnyvale, Calif. 94086

Filed Mar. 1, 1976, Ser. No. 662,436

Int. Cl.² A47B *96/06*; A47F *7/00*

U.S. Cl. 248—201 **6 Claims**



1. A holder for securely mounting a single hand shovel on a piece of equipment comprising:

A. a pair of channel brackets for said shovel;

B. a first one of said channel brackets including:

1. a piece of channel metal having a thin-walled webbing connecting a pair of spaced flanges extending generally orthogonal to said webbing,

2. an open-ended slot extending into said webbing adapted to receive the handle of a shovel adjacent its scoop end, the width of said slot being less than the width of the scoop of a hand shovel intended to be held thereby,

3. means enabling the open end of said slot to be blocked to prevent a shovel from being extracted from said bracket through said open end of said slot, and

4. a block projecting from said webbing into a position at which it will engage the scoop of a shovel in the slot of said webbing to prevent said shovel from being extracted from said slot by passing the handle of said shovel longitudinally through said slot, said block including a tongue projecting angularly upward from adjacent the bottom of said slot in a direction generally parallel to the direction of the shank of the scoop of an upside-down shovel in engagement with said slot;

C. the second one of said brackets including:

1. a piece of channel metal having a thin-walled webbing connecting a pair of spaced flanges extending generally orthogonal to said webbing, and

2. an opening extending through said webbing adapted to receive the handle of said shovel adjacent the free end of said handle; and

D. said channel brackets being adapted for permanent securance to said piece of equipment at locations spaced from one another with said webbing slot and said webbing opening axially aligned with one another for simultaneous engagement of a single shovel by both of said channel brackets.

4,009,854

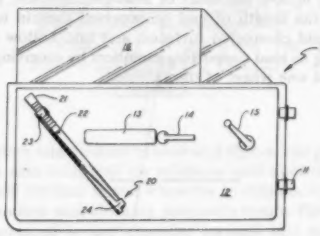
POLICE OFFICER'S CLUB HOLDER FOR VEHICLE DOOR

Charles G. Moyer, 532 Volney St., Phoenix, N.Y. 13135

Filed Dec. 5, 1975, Ser. No. 637,936

Int. Cl.² A47F *5/00*

U.S. Cl. 248—300 **1 Claim**



1. A police officer's club holder for attachment to a vehicle door, comprising: a comparatively narrow strip of manually unbendable metal having holes therethrough for fasteners therethrough for securing the strip to a door, the upper end of the strip being comparatively wider and bent into a substantially U-shaped clip portion for clamping engagement with a club therein, the lower end of the strip being comparatively wider and bent into a substantially circular socket portion for containing one end of a club therein, the socket portion having an integral narrow tongue joined thereto, the tongue being bent into a stop for a club in the socket portion extending diametrically across the bottom end of the socket portion, the substantially U-shaped upper portion being spaced from the substantially circular socket lower portion a distance which is the major portion of the officer's club length, whereby the holder is adapted to be secured to the inner panel of a vehicle door inclined at a small angle from the vertical with the upper end of a club therein projecting from the holder toward the opening side of the door at the top of the panel for being grasped for immediate removal from the holder upon the opening of the door.

4,009,855

TRESTLE

Joachim Hoffmann, and Karl Klinkhammer, both of Bielefeld, Germany, assignors to Gebr. Dickertmann Hebezeugfabric A.G., Bielefeld, Germany

Filed Oct. 6, 1975, Ser. No. 619,853

Claims priority, application Germany, Oct. 12, 1974, 2448751

Int. Cl.² E04G *25/00*

U.S. Cl. 248—352 **7 Claims**

1. A supporting trestle for heavy loads, especially road and rail vehicles comprising

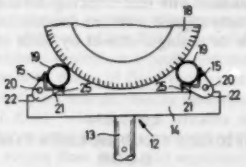
an upright supporting column having a base portion at the lower end thereof;

a support member mounted so as to vertically adjustable is said supporting column;

said support member including an adjustable column therein and locking means to fix said adjustable column with respect to said supporting column;

a longitudinally extending cross beam secured to an upper end of said adjustable column;

a pair of spaced shafts fixed to said cross beam and extending transversely thereto;



a pair of claws each respectively mounted to pivot on one of said shafts, said claws each including a channeled surface which face each other;

a pair of hollow members of a length sufficient to extend along the length of and be received therein in contact with said channeled surfaces, and said hollow members serving as load supporting members by receiving thereon at least one wheel of the vehicle.

4,009,856

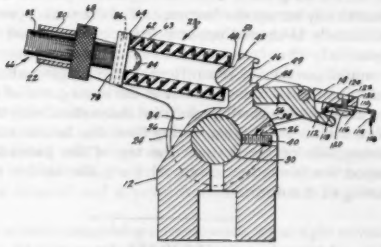
MECHANISM FOR TILTING CHAIRS

Richard H. Wolters, Grand Rapids, Mich., and William E. Stumpf, Winona, Minn., assignors to Herman Miller, Inc., Zeeland, Mich.

Filed Jan. 13, 1976, Ser. No. 648,812

Int. Cl.² A45D *19/04*; A47J *47/16*

U.S. Cl. 248—382 **12 Claims**



1. A tilting chair support mechanism having a support spindle and a seat mounting plate pivotally mounted to the top of said spindle; a spring resiliently urging said plate into a forwardly tilted position; means for limiting the forward tilting movement of said plate, the improvement in said means comprising: a stop on one of said plate and said spindle and a stop engaging latch on the other thereof; said stop having first and second latch engaging walls at different radial spacings from the axis of pivotal attachment of said plate and spindle whereby the forward pivotal movement of said plate is limited at a different position when said latch engages one of said walls than when it engages the other thereof; means mounting said latch for transfer from engagement with one of said walls to engagement with the other thereof.

4,009,857

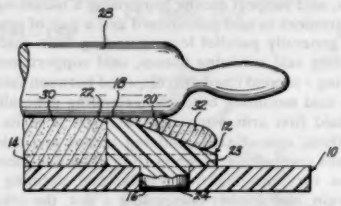
PIE CRUST FORMING AND TRIMMING MOLD

Richard L. Delmas, 7950 Park Blvd., No. 42, Pinellas Park, Fla. 33565

Filed May 27, 1975, Ser. No. 580,939

Int. Cl.² B29C *1/00*; A21C *11/00*

U.S. Cl. 249—102 **3 Claims**



1. A pie crust dough forming and trimming assembly comprising:

a. a planar base element forming a planar a dough roll out surface thereon; the base element including an array of apertures extending completely therethrough;

b. at least one dough mold annular ring element having an annular, flat bottom surface arranged to lie contiguously on said roll out surface and within the outer periphery of said planar base element; the ring element including an internal vertical mold wall corresponding in diameter to the desired diameter of a pie crust dough disc, the height of said wall corresponding to the desired pie crust disc thickness; the bottom surface of the ring element including an array of protuberances extending downwardly therefrom, the protuberances being arranged to fit snugly within said apertures in said base element when the ring element lies contiguously on said roll out surface, said protuberances being spaced from said internal vertical mold wall and lying within the outer periphery of said ring element;

c. said annular ring element further including a narrow, planar upper ledge surface for supporting a dough roll out implement, and a surface downwardly and radially outwardly sloping from the ledge surface, the ledge surface being adjacent the inner wall of the ring and being narrower than the bottom surface of the ring.

4,009,858

LOAF MOLD MAGAZINE ASSEMBLY

Alvin Borsuk; Hans H. Heydn, and Charles H. Johnson, all of Madison, Wis., assignors to Oscar Mayer & Co. Inc., Madison, Wis.

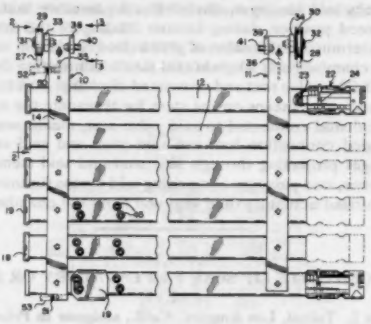
Filed Mar. 11, 1975, Ser. No. 557,302

Int. Cl.² A22C *7/00*

U.S. Cl. 249—120 **1 Claim**

1. A magazine assembly for processing a stuffable food material to produce a loaf food product comprising: a pair of horizontally spaced vertically extending forks, a plurality of vertically spaced horizontally extending tubular molds secured adjacent their opposite ends to the forks, said molds having a uniform cross section, means closing the opposite ends of the molds to hold the food material during processing, rollers mounted at the upper ends of the forks for coacting with support rails on which the magazine is adapted to be moved along a path extending at right angles to the molds, pin means on said forks adapted to be engaged for moving and

positioning the magazine assembly along the rails, and bars on the outside of one fork for coaction with stops to prevent



movement of the magazine in response to application of forces to the molds in the direction of the stops.

4,009,859

PAN FOR BAKING HAMBURGER ROLLS

Albert C. Bangert, 1927 Queenswood Drive, York, Pa. 17403

Filed Jan. 8, 1976, Ser. No. 647,631

Int. Cl.² B28B *7/26*

U.S. Cl. 249—122 **3 Claims**

1. A bakepan for baking substantially square hamburger rolls having one face provided with a substantially square indentation to provide a rim around the perimeter of said one face of said roll, said pan comprising a metal sheet having a plurality of substantially square recesses of uniform depth extending into said sheet from one surface thereof, the bottom of each recess having a substantially square reentrant projection of less area than said recesses extending upward into said recesses to a height less than the depth of said recesses to form a relatively narrow gutter extending around said projections to form rims of substantially uniform height and width around the perimeters of rolls formed in said recesses, and the corners of said projections being provided with a substantially V-shaped radial projection extending partially toward the corresponding corners of said recesses to form notches in the corners of said rims of rolls baked in said recesses and thereby minimize the thickness of said rims of said rolls at the corners thereof to facilitate the formation of rims on said rolls having outermost surfaces thereon disposed within a common plane for close mating with the rim of a similar roll.

4,009,860

SHUTOFF VALVE FOR HIGH-PRESSURE SPRAY GUNS

Horst Lingnau, Rheinhausen, Germany, assignor to Woma-Apparatebau Wolfgang Maasberg & Co. GmbH, Rheinhausen, Germany

Filed May 19, 1975, Ser. No. 579,086

Claims priority, application Germany, May 18, 1974, 2424321

Int. Cl.² F16K *31/383*

U.S. Cl. 251—44 **8 Claims**

1. A valve assembly for a high-pressure medium, especially for a high-pressure spraygun comprising:

a valve housing formed with an outlet for said medium, an inlet for said medium spaced from said outlet, and a cylinder bore between said inlet and said outlet, said cylinder bore having a rear wall remote from said outlet;

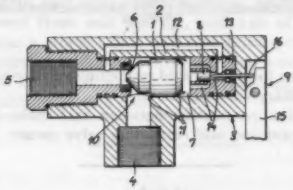
a valve seat formed in said cylinder bore at said outlet;

a differential piston slidably received in said cylinder bore and having a front end engageable with said seat to block flow of said medium from said inlet to said outlet, said differential piston having a rear end defining a pressure chamber in said cylinder bore, rearwardly of said seat, said piston further defining with the wall of said cylinder bore a throttle path between said inlet and said chamber;

a bypass passage formed in said housing and communicating between said outlet ahead of said seat and said chamber;

a control piston shiftable in said housing between a blocking position interupting communication between said chamber and said passage and an open position communicating said passage with said chamber; and

an operating mechanism on said housing for displacing said control piston between said blocking position thereby



enabling said medium to shift said differential piston away from said seat, and for releasing said control piston to permit pressure in said chamber to displace said control piston into said blocking position whereby fluid pressure is increased in said chamber through said passage and said medium thereby displaces said differential piston into contact with said seat, said operating mechanism comprising:

a valve body sealingly received in said cylinder bore behind the rear end of said differential piston and ahead of said rear wall and formed with at least one channel communicating between said chamber and said passage, said control piston being wholly received in and shiftable in said body to selectively block and unblock said channel;

a pin sealingly received in said body and shiftable therein to displace said control piston, and

a lever on said housing engageable with said pin for shifting same.

4,009,861

STEP OPENING GAS VALVE

Paul A. Hirst, Riverside, Calif., assignor to Essex International, Inc., Fort Wayne, Ind.

Filed Feb. 4, 1976, Ser. No. 655,050

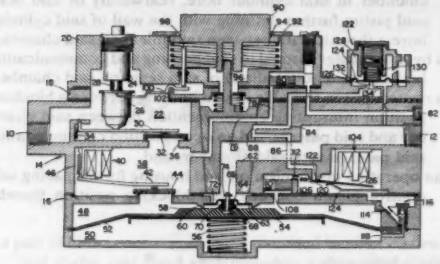
Int. Cl.² F16K *17/10 31/145*

U.S. Cl. 251—61.1 **3 Claims**

1. In a step opening, combination type gas valve including a casing having an inlet and an outlet, a main valve seat located in said casing in the flow path between said inlet and said outlet, main diaphragm valve means located in said casing to control flow between said inlet and said outlet, said main diaphragm valve means comprising a diaphragm member separating a portion of said casing into a first chamber and a control chamber and valve means on said diaphragm adapted for cooperation with said main valve seat, spring means for normally urging said main diaphragm valve means toward said main valve seat, means for causing said main diaphragm valve means to move toward and away from said main valve seat, the improvement which comprises in combination therewith:

an auxiliary valve seat located in said casing, said auxiliary valve seat being recessed from, and concentrically located with said main valve seat;

restricting valve means for restricting the flow of gas therethrough when closed and for allowing an unrestricted flow of gas therethrough when open, said restricting valve means being adapted for cooperation with said auxiliary valve seat and further being mounted upon and operated by said main diaphragm valve means;



spring means for biasing said restricting valve means toward said auxiliary valve seat; and

a lost motion connection between said main diaphragm valve means and said restricting valve means.

4,009,862

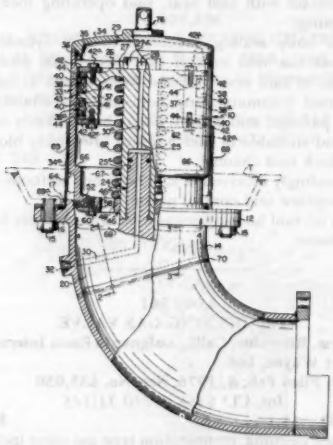
HYDRAULICALLY BALANCED REMOTE CONTROLLED EMERGENCY VALVE FOR STORAGE TANK

Joseph H. DeFrees, 414 Liberty St., Warren, Pa. 16365

Filed Aug. 22, 1975, Ser. No. 606,925

Int. Cl.² F16K *31/122*

U.S. Cl. 251—63 **13 Claims**



1. A remote controlled valve means for a liquid containing tank having a bottom wall, said bottom wall having an opening therein, said valve means comprising a valve seat adapted for coaction with the opening and defining a valve port, a hollow cylindrical type valve housing reciprocally disposed on said seat to control the flow of liquid through said port from and to the tank, a piston head disposed in said valve housing forming an actuating chamber above the piston head, means connecting the piston head to said seat whereby said housing is adapted to vertically reciprocate on the piston head relative to said seat, means for biasing said housing to a lowered position relative to the piston head whereby said housing is maintained in a normally closed position on the valve seat, means for selectively introducing pressurized fluid into and out of said chamber to reciprocate the housing to and from the valve seat for selectively controlling the flow of liquid through said port, means for generally hydraulically balancing said housing whereby said biasing means is effective to move said housing to closed position during bottom loading of the tank upon predetermined exhaustion of pressurized fluid from said actuating chamber, and wherein said means connecting the piston head to the valve seat and associated discharge port comprises a piston stem, means on the stem for threading the stem to a vertical stud connected to said valve seat, means sealing the threaded connection between said stem and said stud, and passages projecting through said stud and said stem to said chamber, said passages comprising said means for introducing pressurized actuating fluid into and from the chamber.

4,009,863

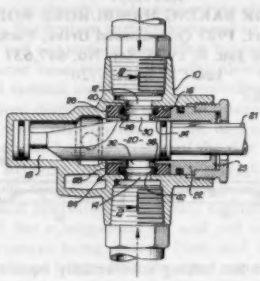
COMPOSITE LIP SEAL FOR LAVATORY OR SINK VALVE

Julius L. Tolnai, Los Angeles, Calif., assignor to Price Pfister Brass Mfg. Co., Pacoima, Calif.

Filed Oct. 17, 1975, Ser. No. 623,436

Int. Cl.² F16K *25/00*

U.S. Cl. 251—172 **2 Claims**



1. In a valve structure:

a. a valve body member;

b. a valve control member;

c. said valve body member having an inlet port opening at a surface opposed to said valve control member;

d. means guiding said valve control member for movement transverse to said inlet port for controlling the flow of fluid, said valve control member having a closed position in which a surface of said valve control member is opposed to and spaced from said valve body member surface;

e. a flexible seal member interposed between said valve control member and said valve body member, said seal member having a passage to conduct fluid from said inlet port to the valve control member, said passage having a multi-sided configuration with corners between the sides;

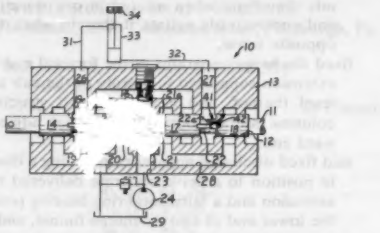
f. said passage having an intermediate enlargement forming a continuous inner lip and a continuous outer lip respectfully cooperable with the valve body member surface and said valve control member surface the distal edges of which lips define said multi-sided configuration; said lips being subjected to fluid pressure conducted to said enlargement via said inlet port to urge said lips into sealing engagement with said surfaces; and

g. compressible and resilient endless ring means fitted in the bottom of said enlargement and about said corners, said ring means having a nominal thickness slightly greater than the nominal spacing between said lips thus providing a mechanical assist to the sealing engagement of said lips to said surfaces and to prevent distortions of said lip from precluding an operative seal, said ring means having a substantially D-shaped cross-sectional configuration with the flat located on the inside of the ring, said D-shaped configuration minimizing lateral bulge at said corners.

4,009,864
THROTTLING SLOT CONFIGURATION FOR A VALVE SPOOL

Lawrence F. Schexnayder, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Feb. 4, 1975, Ser. No. 546,950
Int. Cl.² F16K *47/04, 5/10, 11/07*
U.S. Cl. 251—282 **8 Claims**



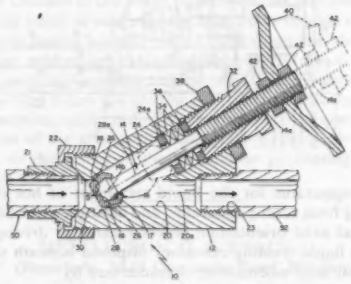
1. In a control valve having a spool reciprocable along its axis within a bore formed in the valve with the spool having a reduced diameter portion and an axially adjacent land formed thereon for controlling fluid flow from a high pressure source to an area of low pressure upon movement of the spool in one direction in which the land leads the reduced diameter portion, wherein the improvement comprises:

means forming a throttling slot in the spool interconnecting the reduced diameter portion and a peripheral surface of the land, said throttling slot including means forming a pocket recessed into the land and means forming a groove having sides which extend from the pocket longitudinally along the spool substantially parallel to the axis of the spool and an end connected to the sides and intersecting said reduced diameter portion, said pocket having a sidewall disposed remote from the groove and inclined relative to the axis of the spool in a direction radially outwardly and axially opposite to the one direction.

4,009,865
REGULATING FLOW

Irwin H. Davlin, 714 S. Court St., Opelousas, La. 70570

Filed Sept. 15, 1975, Ser. No. 613,280
Int. Cl.² F16K *1/10*
U.S. Cl. 251—318 **1 Claim**



1. A valve comprising:

a body having a straight-through flow passage,

said passage having a longitudinal axis therethrough and a cross-sectional area perpendicular to said axis,

a valve head moveable at a first acute angle with the downstream end of said passage into and out of said passage, and

a valve seat extending about said passage for cooperation with said valve head to adjust said valve over a range from the wide-open to the closed condition,

said valve seat approaching said axis of said passage no more closely than does the wall of the narrowest portion of said passage upstream or downstream of said seat,

said seat being formed by an annular first recess in the wall of said passage, the plane of said recess being at a second acute angle to said axis of said passage,

said first recess being formed by a first bore extending at said first acute angle into said passage, said bore permitting said valve head to pass therethrough,

said wall of said passage having a second recess therein formed upstream of said first recess, said second recess permitting said valve head to extend through and beyond said seat,

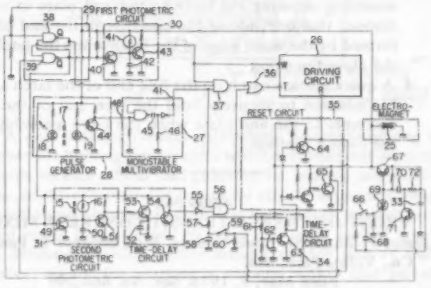
said second recess being formed by a second bore, coaxial with said first bore, narrower than said first bore, and deeper than said first bore,

whereby in said wide-open condition, said valve head is removed from said passage, said axis of said passage remains a straight line, and said cross-sectional area of said passage at the position of said seat is no less than it is at the narrowest portion of said passage upstream or downstream of said seat.

4,009,866
EXPOSURE CONTROL DEVICE

Hiroshi Iwata, Osaka, and Katsuji Ishikawa, Higashi-Osaka, both of Japan, assignors to West Electric Company, Ltd., Japan

Filed Oct. 14, 1975, Ser. No. 621,845
Claims priority, application Japan, Oct. 18, 1974, 49-120900
Int. Cl.² G03B *7/14*
U.S. Cl. 354—29 **4 Claims**



1. In exposure control device of the type comprising exposure means comprising

a plurality of shutter blades which also function as the aperture setting blades,

a setp-motor drivingly coupled to said shutter blades for displacing stepwise said shutter blades, and

a driving circuit adapted to control the at least one rotation of said step-motor in response to the driving pulse and pulse signal generating means adapted to generate the driving pulse or pulses in response to the brightness of a subject detected and to apply said driving pulse or pulses to said driving circuit, thereby causing said shutter blades to open and close, an improvement comprising

a. step-motor locking means adapted to lock said step-motor in inoperative position when said shutter blades remain closed, and but to release said step-motor when the exposure operation is started,

b. means adapted to control said step-motor locking means.

4,009,867

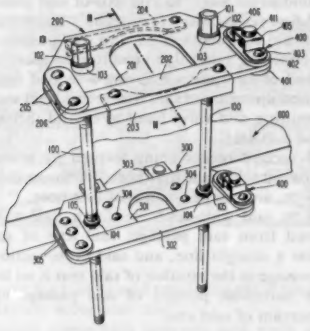
SPRING COMPRESSOR

Walter L. Diffenderfer, Lancaster, Pa., assignor to K-D Manufacturing Company, Lancaster, Pa.

Filed Apr. 26, 1976, Ser. No. 680,157

Int. Cl.² B23P *19/04*

U.S. Cl. 254—10.5 **5 Claims**



1. A spring compressing unit for use with a MacPherson strut assembly comprising:

a. Two parallel end plates adapted to securely engage the housing containing the ends of the spiral spring of the MacPherson strut assembly, wherein apertures in said end plates allow the tubular shock assembly of said MacPherson strut assembly to extend through and beyond said end plates;

b. Support means joining the two end plates adapted to vary the perpendicular distance between the two end plates to compress the spring as desired;

c. Latch means to secure the MacPherson strut assembly in place pivotally mounted on each end plate comprising a latch having a pivotal end and a free end and a pivotal mounting securing the latch to the end plate in such a manner that one side of the aperture in the end plate is formed by the inner edge of the latch when the latch is in the closed position;

d. A quick release catch on the free end of the latch assembly adapted to securely hold the free end of the latch assembly to the end plate when the latch assembly is in the closed position.

4,009,868

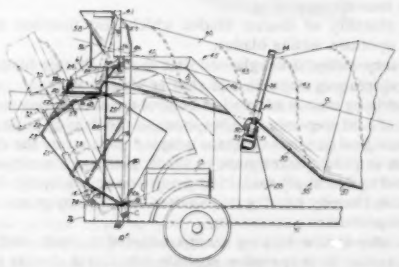
FRONT-DISCHARGE TRANSIT CONCRETE MIXER

James P. Blind, St. Louis County, Mo., assignor to Panaview Co., Valley Park, Mo.

Filed Mar. 5, 1976, Ser. No. 664,295

Int. Cl.² B28C *7/16, 5/18*

U.S. Cl. 259—172 **14 Claims**



1. A front discharging transit concrete mixer comprising

a tiltable cab-around-engine truck chassis of the type having

means to permit forward tilt of the cab through an angle of substantially 45° or more about a lower forward transverse tilt axis and having within the cab an engine enclosure and a driver's position at one side thereof,

a rotatable mixer barrel mounted on said chassis and having an axis of rotation directed forward and slantingly upward and having a barrel extension therealong projecting forward beyond the cab, said barrel and barrel extension having internal vanes so convoluted as to deliver concrete mix therefrom when rotated in one sense and to retain and continuously agitate it therein when rotated in the opposite sense,

fixed discharge apparatus at the forward end of said barrel extension supported forwardly of the cab and above the level thereof, and having support structure including columns laterally outward of the cab adjacent to its forward end,

said fixed discharge apparatus including a discharge funnel in position to receive concrete delivered by said barrel extension and a horizontal ring bearing positioned about the lower end of said discharge funnel, and

a removable discharge chute the upper end of which is supported rotatably by and beneath said ring bearing in position to receive concrete from said discharge funnel,

the cab roof and rear wall having a channel portion under the barrel extension and over the engine enclosure, whereby to accommodate said barrel extension,

said channel portion increasing in depth toward the rear sufficiently to pass said barrel extension when the cab is tilted forward,

whereby, on removal of said removable discharge chute from its support by said ring bearing, the cab may be tilted fully forward beneath the fixed discharge apparatus and between the columns for access to the engine.

4,009,869

APPARATUS FOR TREATMENT OF ROLLED WIRE

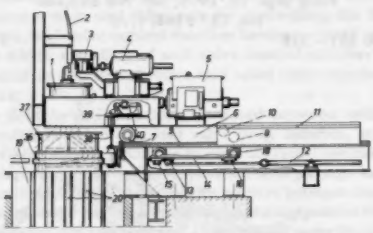
Karl Rebuschat, Duisburg, Germany, assignor to Demag Aktiengesellschaft, Duisburg, Germany

Filed Aug. 6, 1975, Ser. No. 602,200

Claims priority, application Germany, Aug. 10, 1974, 2438565

Int. Cl.² C21D *1/62*

U.S. Cl. 266—112 **7 Claims**



2. Apparatus for the liquid treatment of hot rolled wire issuing from rolling apparatus, and having a wire coiling reel in vertical axial orientation, power means for driving said reel and a liquid treating container disposed beneath said reel in vertical axial orientation; characterized by

a. said container being closed at the bottom with an open top for receiving wire coiled by said reel;

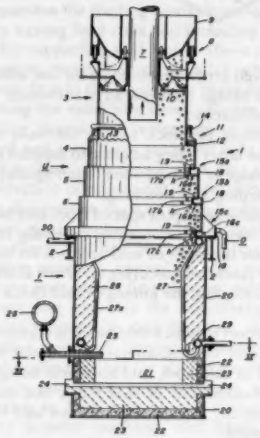
b. a liquid treating medium in said container, said container receiving and treating said wire simultaneously as it is coiled by said reel;

c. first means for supporting said reel over said container;

d. first means including reversible power means for moving said support means toward and away from said container for moving said reel in a first position over said container and then away from said container to a second position;

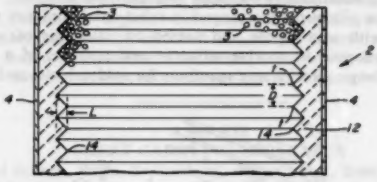
e. a first pair of rails for supporting said first support means for movement of said reel from said first position to said second position and vice versa;
f. said reel being cantilevered from said first support means; and
g. said first pair of rails ending at a point spaced from said container.

4,009,870
METALLURGICAL SHAFT FURNACE
Richard F. Obenchain, 3340 Comanche Road, Pittsburgh, Pa. 15241
Filed June 22, 1976, Ser. No. 698,355
Int. Cl.² C21B *7/10, 7/02*
U.S. Cl. 266—192 **16 Claims**

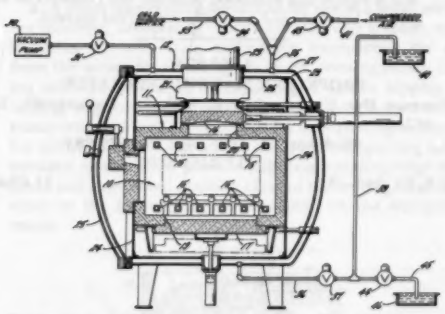


1. In a metallurgical shaft furnace adapted to the production of molten metal from a charge, the furnace comprising an upper preheating portion and a lower melting portion terminating at its bottom in a hearth and having tuyeres therein, the improvement wherein
a. the upper portion is comprised of concentric sections, each said section increasing in diameter with respect to an adjacent section from the upper charging section thereof to the lower melting portion, the charging section having an exhaust means and charging means, and a water channel at the lower portion thereof and means for feeding water to said channel, with other of adjacent said sections having a water trough therearound on the outer surface, said trough extending inwardly to form a cooling ring, each said cooling ring increasing in diameter from the section below the charging section to said lower melting portion, said cooling rings providing support for a portion of the charge to the furnace so as to divert hot gases to the center of the furnace for preheating of the charge therein.

4,009,871
METALLURGICAL FURNACE
Richard F. Obenchain, 3340 Comanche Road, Pittsburgh, Pa. 15241
Filed June 22, 1976, Ser. No. 698,356
Int. Cl.² C21B *7/10, 7/02*
U.S. Cl. 266—193 **6 Claims**

1. In a metallurgical furnace for use with sized material wherein the metal oxide component of the material has an average size between ¼ to 2 inches in diameter, having a preheating portion of a specified diameter wherein the sized material remains as integral solids, the improvement comprising:
a plurality of inwardly directed projections about the interior wall of said preheating portion;
the projections having a length equal to between 5 percent

to 15 percent of the diameter of the preheating portion, with adjacent projections being spaced from each other a distance equal to between two to ten times the length of the projections.

4,009,872
ENERGY-CONSERVING, FAST-COOLING HEAT TREATING FURNACE
John F. McCoy, Rockford, Ill., assignor to Alco Standard Corporation, Valley Forge, Pa.
Filed June 25, 1976, Ser. No. 699,951
Int. Cl.² C21D *1/00*
U.S. Cl. 266—250 **4 Claims**



1. A heat treating furnace comprising a vessel defining a chamber for holding workpieces, selectively operable heating elements located within said chamber for heating said workpieces, selectively operable means for circulating a quenching gas within said chamber to cool said workpieces, at least part of said vessel being formed by inner and outer spaced apart walls defining a hollow jacket around at least part of said chamber, means for creating a vacuum within said jacket while said workpieces are being heated thereby to reduce heat transmission from said inner wall to said outer wall and to keep the latter wall comparatively cool, and means for circulating liquid through said jacket while said workpieces are being cooled by said quenching gas whereby said liquid cools said inner wall and said quenching gas to promote fast cooling of said workpieces.

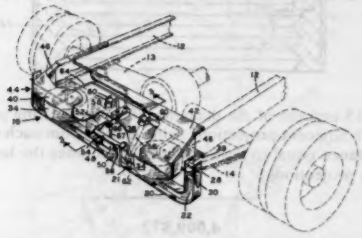
4,009,873
AIR-RIDE SUSPENSION ASSEMBLY
Philip J. Sweet; Buck C. Hamlet, and David L. Sweet, all of Fresno, Calif., assignors to American Carrier Equipment, Inc., Fresno, Calif.
Filed Oct. 20, 1975, Ser. No. 623,646
Int. Cl.² B60G *11/46*
U.S. Cl. 267—15 A **9 Claims**

1. An air-ride suspension assembly particularly adapted to be installed as an integrated unit on the frame of a wheeled vehicle comprising:

A. a cradle adapted to be extended transversely beneath the frame of a selected vehicle and supported at each of the opposite ends thereof by said vehicle;

B. a pair of laterally spaced air bags mounted on said cradle in substantially coplanar relation therewith;

C. a pillow plate arranged in substantial coplanar relation with said cradle and seated on said pair of air bags adapted to receive adjacent end portions of a pair of longitudinal frame members for said vehicle; and



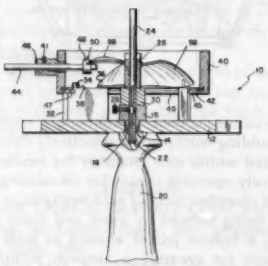
D. centering means for supporting said frame in a centered relationship with said cradle comprising a pair of laterally spaced brackets, one bracket of said pair being rigidly affixed to said cradle and projected upwardly therefrom and the other bracket of said pair being rigidly affixed to said pillow plate and projected downwardly therefrom, and a radius rod extended between the brackets of said pair of brackets and pivotally connected thereto.

4,009,874

PROPELLER MAKING APPARATUS

Emerson Dee Hughey, 840 E. 64th St., Indianapolis, Ind. 46240

Filed Apr. 26, 1976, Ser. No. 679,984
Int. Cl.² B25B *9/00*
U.S. Cl. 269—3 **11 Claims**



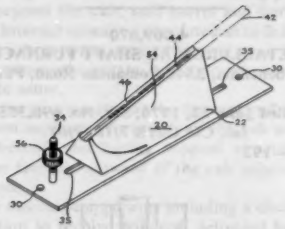
1. Apparatus for making a propeller from a propeller hub and a plurality of propeller blade blanks, comprising a base; a shaft extending upwardly from said base for receiving the propeller hub; a plurality of blocks corresponding in number to the number of blade blanks and mounted on said base in a radial arrangement about said shaft; a pin extending upwardly from each of said blocks, said pins being disposed at equal radial distances from said shaft; positioning means mounted on said blocks; a collar positioned on said blocks by said positioning means and rotatable with respect thereto; a plurality of radially arranged inwardly extending arms mounted on said collar and corresponding in number to the number of blade blanks; and holding means mounted on each of said arms whereby each blade blank is supportable by contact with the hub, one of said pins, and said holding means on one of said arms, with the pitch angle of each blade blank with respect to the hub depending upon the position of rotation of said collar with respect to said blocks.

4,009,875

FLETCHING JIG

Roger S. Erlandson, Rte. 2, Box 2185, Elk Grove, Calif. 95624

Filed Aug. 13, 1976, Ser. No. 714,029
Int. Cl.² B25B *1/20*
U.S. Cl. 269—38 **10 Claims**



1. An improved arrow fletching jig for use with a multi-vane fletch having a bridge between adjacent vanes, said jig comprising, in combination:

a. an upstanding jig block having sidewalls and an upper surface, the latter being adapted to support an arrow shaft and the bridge of a multi-vane fletch against said shaft for proper bonding and fletching;

b. an upstanding nock post spaced from said block, said post including means for releasably receiving the nock of an arrow when the shaft of said arrow is on said block;

c. means for releasably securing an arrow shaft to said block and for facilitating the joining of said fletch bridge to said shaft; and,

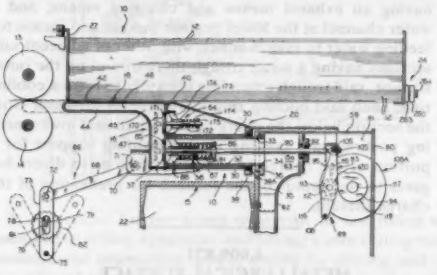
d. a base support to which said block is secured and defining a plurality of vertical apertures adapted to receive the lower end of said post, said apertures being spaced along the longitudinal axis of said block but external of said block, whereby the spacing between said block and post can be varied.

4,009,876

SHEET FEEDING MECHANISM

Raimond J. Smiltneek, Butler, Wis., assignor to Uniplex, Inc., Milwaukee, Wis.

Filed Mar. 24, 1975, Ser. No. 561,411
Int. Cl.² B65H *3/12*
U.S. Cl. 271—99 **16 Claims**



1. Apparatus for feeding blanks into process machinery and including translatable means including enclosure defining means and perforated blank engaging means mounted on an upper portion of said enclosure defining means for engaging said blanks and operative when said enclosure defining means is subjected to a vacuum to grip a blank,

operating means for reciprocating said translatable means from an initial position and in a first direction toward said process machinery and for return movement to said initial position,

elongated tubular means extending generally in the direction of movement of said translatable means, said tubular means being connected to a vacuum source and having an opening adjacent one end,

said translatable means including sleeve means affixed to said enclosure defining means and telescopingly movable with respect to said tubular means for placing said enclosure defining means in communication with said tubular means through said opening,

said enclosure defining means being disposed adjacent said tubular means opening and is in communication therewith when said translatable means is in its initial position, and

evacuating valve means for sealing the opening in said tubular means and valve operating means for opening and closing said valve means in timed relation to the cycle of said translatable means.

15. Apparatus for feeding blanks from a stack into process machinery having feed rolls and including a suction means,

means for supporting said blanks above said suction means,

said suction means being operative when subjected to a vacuum to grip the lowermost blank in said stack and for releasing the same in a timed relation,

translating means for reciprocating said suction means toward and away from said feed rolls,

first and second frame means extending generally parallel to the direction of movement of said suction means and one being disposed on each of the opposite sides thereof, said support means including a first elongate member extending between said first and second frame means and in a direction generally normal thereto, means mounting the opposite ends of said first elongate member on said frame portions and operable for selectively moving said first elongate member in said direction, said support means including a second elongate member mounted on said first elongate member for pivotal movement about an axis generally parallel to said direction, and locking means operative to lock said second elongate member in its pivotal angular position, and blank engaging means mounted on said second elongate member and being pivotal therewith.

4,009,877

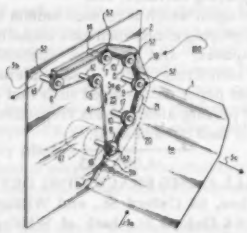
DOCUMENT TRANSPORT DEVICE

John Wesley Ward, Jr., Pflugerville, Tex., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 3, 1975, Ser. No. 627,984

Int. Cl.² B65H 29/16

U.S. Cl. 271—272 **3 Claims**



1. Document transport apparatus, comprising:

a. a drive train assembly comprising a plurality of idle pulleys, a belt of relatively high coefficient of friction material disposed around said pulleys, and means for continuously advancing said belt along a transport path from a single document entry location to a document exit location defined by said pulleys, and

b. a rigidly mounted strip of material having a low coefficient of friction, said strip having a principal surface following the contour of, and cooperating with, said belt to define a guideway for documents advanced along said transport path, said principal surface having first surface portions recessed from said pulleys and said second surface portions intermediate said pulleys immediately adjacent said belt defining document pinch points, whereby documents aligned within said guideway are transportably engaged by said belt at said pinch points and are substantially released from said engagement at the location of said first recessed surface portions.

4,009,878

SHEET CARRYING APPARATUS

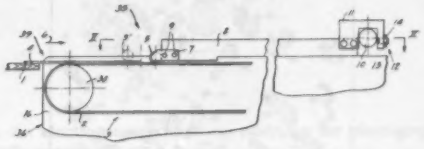
Paul Scheck, Prille, Switzerland, assignor to J. Bobst & Fils, S.A., Switzerland

Filed Sept. 11, 1975, Ser. No. 612,571

Claims priority, application Switzerland, Oct. 2, 1974, 013250/74

Int. Cl.² B65H 5/02

U.S. Cl. 271—272 **10 Claims**



1. A sheet transporting apparatus for use in a sheet processing machine, comprising means for receiving a sheet, means including a transporting surface for transporting the sheet from the means for receiving the sheet, pressing means coacting with the means for transporting to ensure nipping of a leading edge of a sheet between the pressing means and the transporting surface of the means for transporting, and means for shifting the pressing means along the transporting surface between an advanced position engaging a leading edge of the sheet and a retracted position clear of the leading edge of the sheet as the leading edge is deposited on the transporting means.

4,009,879

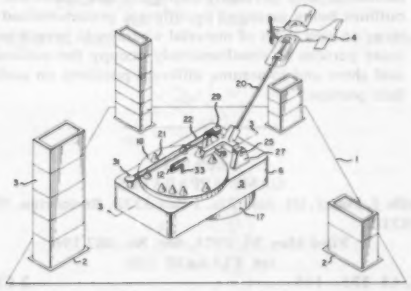
BARNSTORMER GAME

Tobin Wolf, 285 Aycrigg Ave., Passaic, N.J. 07055

Filed Feb. 27, 1975, Ser. No. 553,690

Int. Cl.² A63H 17/00

U.S. Cl. 272—31 A **10 Claims**



1. A toy or game which includes a base,

a platform rotatable on said base about a first axis,

camming means rotatable on said platform about a second axis displaced from and parallel to the first axis and provided with a plurality of randomly spaced lobes,

drive means

means cooperating with the drive means to effect simulta-

neously rotation of the platform and said camming means about their respective axes.

an object, means mounting said object to the platform to rotate therewith about said first axis and to have motions normal to the plane of said platform,

said object being provided with a cam follower cooperating with each of said lobes for effecting said motions of the object normal to the plane of said platform at random intervals upon operation of said drive means.

4,009,880

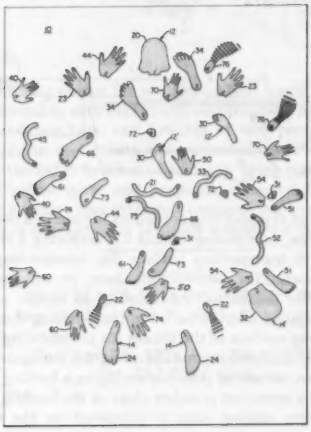
RECREATIONAL DEVICE

William B. Lammersen, Littleton, Colo., assignor to Patterns to Play By, Inc., Golden, Colo.

Filed Nov. 17, 1975, Ser. No. 632,503

Int. Cl.² A63F 9/00

U.S. Cl. 273—1 R **4 Claims**



1. In combination, an amusement device comprising:

a substantially flat horizontal surface portion,

outlines of at least a pair of human forms represented on the surface portion, the outline of each human form being defined by representations of extremities of the human body with distinctive patterns to represent face-up and face-down positions of the human form, and each having a different distinctive representation than each other outline so as to be readily distinguishable therefrom, said outlines being arranged in different predetermined patterns on said sheet of material whereby to permit two or more persons to simultaneously occupy the outlines on said sheet and to assume different positions on said surface portion.

4,009,881

GAME APPARATUS

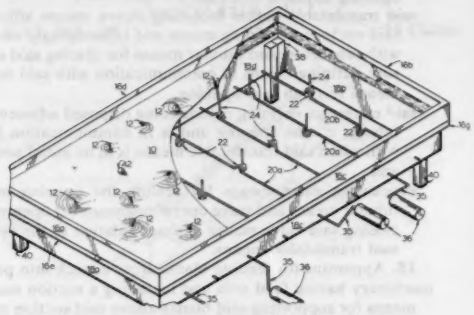
Orville J. Potter, III, Star Rte. 1 Box 333B, Bremerton, Wash. 98310

Filed May 30, 1975, Ser. No. 582,196

Int. Cl.² A63F 7/06

U.S. Cl. 273—115 **2 Claims**

2. In a game apparatus wherein a ball adapted to roll upon the top surface of a horizontally disposed, flexible sheet stretched across a rectangular frame is propelled across the surface of said sheet by actuating means for producing vertical displacements of said sheet at localized areas, said sheet having goals positioned at opposite ends thereof, the improvement whereby each of said goals comprise an area of said sheet depressed beneath the mean level surface of said sheet and having a sufficient depth to retain said ball, said depressed areas conforming to indentations in the top edge of said frame at opposite ends thereof having a width equal to the width of



said goal whereby balls entering said goals are retained against the respective end walls of said frame.

4,009,882

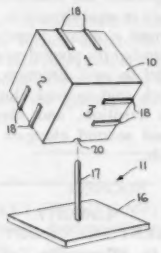
THREE-DIMENSIONAL WORD GAME APPARATUS

James E. Rader, R.F.D. One, Plainfield, Vt. 05667

Continuation-in-part of Ser. No. 494,984, Aug. 5, 1974, Pat. No. 3,930,651. This application Jan. 5, 1976, Ser. No. 646,478

Int. Cl.² A63F 3/00

U.S. Cl. 273—135 D **10 Claims**



1. A three-dimensional word game apparatus, which comprises:

a cubical solid having six faces defining respectively six different playing surfaces; and

paper means upon which is formed indicia indicative of six individual playing areas, each area including a plurality of playing spaces, and location identification indicia uniquely identifying each of said plurality of playing spaces, said paper means sized such that each of said six individual playing areas covers respectively each of said six faces of said cubical solid.

4,009,883

BALL GAME PRACTICING DEVICE

Stuart Yellowlees, 64 Oxford St., and William Neil Dey, c/o Yellowlees, 64 Oxford St., both of Whitley Bay, Tyne & Wear, England

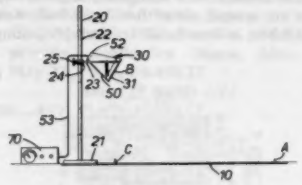
Filed June 13, 1975, Ser. No. 586,701

Int. Cl.² A63B 69/36

U.S. Cl. 273—181 C **7 Claims**

1. Apparatus for practising ball games comprising: a base line, defined on a board or sheet defining a ball striking position and a vertical axis position for a target; target supporting means adjustably supported on vertical support means and the target being adjustably supported on the target support means; a microphone positioned at a predefined distance and orientation from the centre of the target, said microphone serving to receive a sound produced by a ball impacting against said

target; and measuring means connected to said microphone for receiving output signals therefrom and measuring such



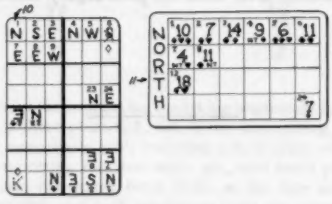
signals and in response providing an indication of the intensity of the impact of a ball.

4,009,884

BRIDGE GAME

William Weigl, 11033 Greenhaven Parkway, Brecksville, Ohio 44141

Filed Oct. 25, 1973, Ser. No. 409,640
Int. Cl.² A63F *1/00*
U.S. Cl. 273—149 P **12 Claims**



1. In a contract bridge game for play by two or three players, wherein an unexposed predetermined thirteen-card dummy hand is preliminarily established at each hand played for bidding thereon by at least one of said players and thereafter thirteen cards are dealt to each player,

a standard four-suit bridge deck of fifty-two cards,

coding means associated with the cards of said deck for selecting, without viewing the faces thereof, a plurality of different predetermined dummy hands from said deck, and

means associated with the faces of the cards of each different predetermined dummy hand of said deck for indicating the general strength without revealing the specific contents of each predetermined dummy hand to provide at least each bidding player with an approximate indication of the combined strength of his specific hand and a given unexposed predetermined dummy hand, as a basis from which each bidding player may contract for the number of individual tricks such bidding player expects to take subsequently upon laying open said dummy hand and actually playing a game.

10. The method of playing a two-handed bridge game utilizing a standard four-suit bridge deck of fifty-two cards, comprising the steps of,

selecting from said deck, without viewing the faces of the cards thereof, a predetermined thirteen-card dummy hand in accordance with an established coding system associated with said cards,

dealing a thirteen-card hand to each player and setting aside the remaining thirteen cards,

making available to at least one of said players general, but not specific, information relative to the approximate contents of said predetermined dummy hand while said hand remains unexposed,

contract bidding for said dummy hand by each bidding player combining the specific strength of his hand with the approximate strength of said unexposed dummy hand,

exposing said dummy hand by laying it open opposite the bidder to whom the dummy is awarded upon completion of bidding, and

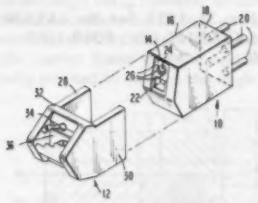
playing said hand in accordance with the established rules of bridge.

4,009,885

STEREO PHONOGRAPH PICK-UP CARTRIDGE

Peter E. Pritchard, New Milford, Conn., assignor to Sonic Research Inc., Danbury, Conn.

Filed Sept. 8, 1975, Ser. No. 611,214
Int. Cl.² G11B *3/46*; H04R *1/16*, *11/08*
U.S. Cl. 274—37 **8 Claims**



1. An electromagnetic pick-up cartridge for phonograph records comprising:

a housing containing sensing means and having a noncircular aperture in the forward wall thereof;

a stylus assembly including a rearwardly-extending boss adapted for insertion into said aperture in a slight interference fit, whereby said assembly may be secured to said housing;

a stylus cantilever mounted in said stylus assembly on a resilient pivot block, said pivot block comprising an outer, cylindrical portion and an inner, inwardly-tapering portion terminating in a square, stylus cantilever-engaging aperture, said engagement defining the pivot point of said cantilever;

a magnetically permeable armature forming part of said cantilever; and

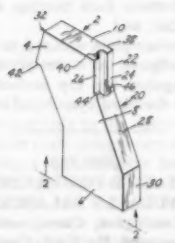
a magnet mounted in said stylus assembly to magnetically energize said armature.

4,009,886

SPINDLE ADAPTER

Gerald Shirley, 111 Lake Ave., Tuckahoe, N.Y. 10707

Filed Sept. 18, 1975, Ser. No. 614,641
Int. Cl.² G11B *17/04*
U.S. Cl. 274—10 S **11 Claims**



1. A flat spindle adapter for use with a record changer having a rotatable turntable and a small diameter spindle adapted to receive a record with a small diameter central opening, said spindle having means for supporting a record at a proximal edge thereof, said proximal edge defining the small diameter central opening of the record, said spindle also having means for shifting a record laterally relative to said spin-

dle, said spindle adapter having a body with a passageway to receive said small diameter spindle, said passageway having an exposed segment at least at the said spindle supporting means, means associated with said passageway to fix the position of the spindle adapter so that the line defining the path of movement of the said record shifting means is at an angle of from about 5° to about 45° relative to the line formed by extending a diameter line of the spindle through the midpoint of the exposed segment of said passageway

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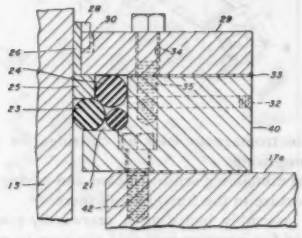
4,009,887

HYDRAULIC PRESS SEAL

Paul D. Hanson; Jack E. Binning, and Harry J. Kent, all of Pittsburgh, Pa., assignors to Dravo Corporation, Pittsburgh, Pa.

Filed Dec. 31, 1975, Ser. No. 645,670
Int. Cl.² F16J 1/00; B30B 1/32
U.S. Cl. 277—187 **5 Claims**



1. A seal assembly for sealing the peripheral gap between a vertically movable ram and a stationary fluid reservoir of a hydraulic press to prevent fluid leakage therebetween, said seal assembly comprising:

a. a first elongated, resilient, cylindrical member longitudinally disposed in a longitudinally extending, generally semi-circular channel formed in the top edge of the fluid reservoir and confronting the side wall of the ram;

b. a second elongated, resilient, cylindrical member disposed parallel to and in abutting relationship with the first cylindrical member;

c. a third elongated, resilient, cylindrical member disposed parallel to, overlying and in abutting relationship with the first and second cylidrical members;

d. a plurality of adjacent elongated metal strips, with a narrow gap between adjacent strips, each of said strips being rectangular in transverse section and disposed parallel to said cylindrical members, one vertical face of said strip bearing against the third cylindrical member, the other vertical face bearing against the side wall of the ram and the bottom face bearing against the second cylidrical member; and

e. an elongated cover plate secured to the top surface of side wall, one edge of the cover plate overhanging edge bearing both against the top surface of the elongated metal strip and the third cylindrical member.

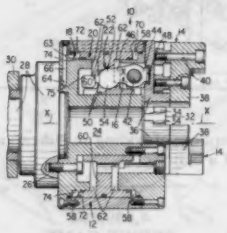
4,009,888

SELF-CONTAINED POWER CHUCK WITH CENTRIFUGALLY BALANCED JAWS

Walter Wallace, Kensington, Conn., assignor to Cushman Industries, Incorporated, Hartford, Conn.

Filed Nov. 24, 1975, Ser. No. 634,621
Int. Cl.² B23B 31/14
U.S. Cl. 279—1 C **6 Claims**

1. A chuck providing jaws; a body having a longitudinal axis and a front face with ways for guiding said jaws for movement radially of said axis; a cylinder chamber in said body cross-sectionally ring-shaped about said axis; a sleeve-type piston in said cylinder chamber; levers pivoted in said body about axes normal to said body axis and providing on opposite sides of their pivot axes first and second arms extending substantially longitudinally of said body axis, of which said first arms are operatively connected with said jaws, respectively, and said second arms are spaced closer from said body axis than said cylinder chamber; a drawhead on and projecting inwardly



from said piston and having cam surfaces inclined to said body axis, with said second lever arms having follower surfaces in engagement with said cam surfaces, respectively, for moving said jaws into and from gripping engagement with work on movement of said piston in opposite directions; and weights on said second lever arms for centrifugally balancing said jaws.

4,009,889

TRAILER COUPLING

Marjorieann M. Smith, 3825 Valley, Sp. 56, Walnut, Calif. 91789

Filed June 16, 1975, Ser. No. 587,159
Int. Cl.² B62D 63/06; B60D 1/00
U.S. Cl. 280—423 R **6 Claims**

1. A trailer to be towed by a vehicle having a rear trailer hitch including a coupling ball, comprising:

a generally flat frame including a relatively low-slung bed and front converging tongue members forming a hitch tongue at the front end of said bed,

a coupling member located above and forwardly of the front ends of said tongue members and having a socket for rotatably receiving said coupling ball,

connecting means fabricating separately from and extending between said tongue members and coupling member and having upper and lower ends rigidly joined to said coupling member and tongue member ends, respectively,

said connecting means comprising a pair of upper and lower generally U-section channels having side flanges and arranged with their open sides facing one another, their lower ends straddling the upper and lower sides of said tongue member ends and their flanges disposed in overlapping face to face contacting relation, means joining said overlapping flanges to one another, means rigidly securing said lower channel ends to said front tongue member ends, and means rigidly securing the upper channel ends to said coupling member, and

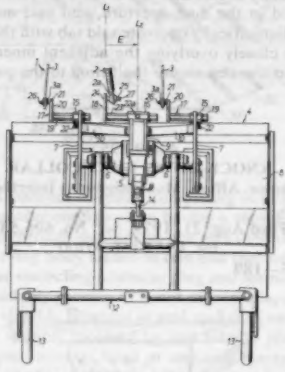
wheels mounted on said frame bed along the sides of the bed.

4,009,890

DEVICE FOR CONNECTING WORKING IMPLEMENT TO TRACTOR

Hiroaki Kawakita, and Shigeru Morita, both of Sakai, Japan, assignors to Kubota, Ltd., Osaka, Japan

Filed Mar. 12, 1976, Ser. No. 666,510
Claims priority, application Japan, Mar. 19, 1975, 50-37326; May 21, 1975, 50-69627
Int. Cl.² B60D 1/16
U.S. Cl. 280—467 5 Claims



1. A device for connecting a working implement to a tractor including a three-point link, the device comprising generally L-shaped connectors each including a base plate with a projecting connecting rod and hitch pin, said hitch pins to be inserted into respective hitch holes at the rear end of the three-point link and each projecting from the connector eccentrically of the connecting rod, the connecting rod being slidable and fixedly mountable in a connecting bore formed in a frame of the implement laterally thereof to render the working implement connectable to the tractor in either of interchangeable tandem and offset arrangements.

4,009,891

HAND TRUCKS

Oystein Jensen, 8355 Ny Solbjerg, Onstedvej 9, Denmark

Filed July 1, 1974, Ser. No. 485,040
Int. Cl.² B62B 3/02
U.S. Cl. 280—651 7 Claims

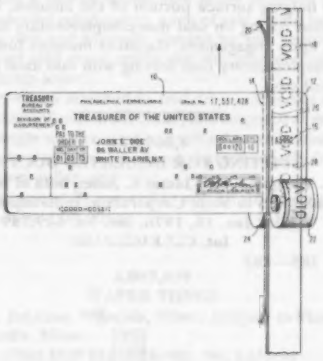
1. A hand truck comprising a driving chassis having a front end portion and a rear end portion and a telescopic tube arranged therebetween so as to allow the distance between said front and rear end portions to be varied, front wheel means mounted on said front end portion and rear wheel means mounted on said rear end portion so as to be operable to support the driving chassis on the ground with said telescopic tube substantially parallel therewith, an article carrier frame element pivotally secured to said front end portion of said chassis so as to be pivotal relative to the ground supported driving chassis between an upright loading position substantially perpendicular to the driving chassis and a tilted transport position in which the carrier frame is inclined rearwardly over the carrier chassis so as to form an actue angle therewith, carrier frame element support means interposed between said carrier frame element and said driving chassis so as to be operable to support the frame element in its said transport position relatively to the driving chassis, and a connector rod hinged at its opposite ends to said rear chassis end portion and a point of said frame element above the pivoting axis of the frame element, respectively, so as to be operable to cause said telescopic tube to expand and said rear chassis end portion to be displaced away from said front chassis end portion in direct response to the carrier frame element and the driving chassis being mutually pivoted to diminish the angle therebetween, while correspondingly being operable to cause said telescopic tube to contact and said rear chassis end portion to be displaced towards said front chassis end portion in direct response to the carrier frame element and the driving chassis being mutually pivoted to enlarge the angle between them.

4,009,892

METHOD AND PRODUCT FOR PREVENTING FRAUD IN DOCUMENT IDENTIFICATION

Eugene W. Nickerson, III, 19 Colvin Road, Scarsdale, N.Y. 10583

Filed Feb. 3, 1975, Ser. No. 546,595
Int. Cl.² B42D 15/00; C09D 11/00
U.S. Cl. 283—6 13 Claims



1. A method for protecting a payment order or similar instruments against collection by unauthorized persons comprising the steps of

placing on a portion of said payment order a secret code designation known only to the correct payee,

covering said secret code designation with a light impervious cover having a light-sensitive material micro-encapsulated in the surface thereof adjacent to the surface of said payment order, said material becoming irreversibly developed upon exposure to light,

and exerting pressure in a pattern on the combination of said cover and said payment order to cause the micro-encapsulated light-sensitive material to be released from said cover and to be adhered to the adjacent surface of said payment order in the localized areas of the pattern of pressure so that whenever said cover is removed to expose said light-sensitive material said pattern of pressure soon becomes visible to thereby make premature removal detectable.

4,009,893

TUBING OR CASING JOINT

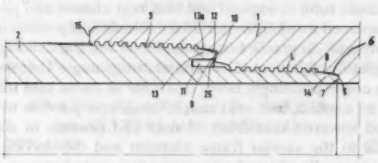
Paul Schatton, Dusseldorf, and Wolfgang Hellmund, Viersen, both of Germany, assignors to Mannesmannrohren-Werke AG, Dusseldorf, Germany

Filed Sept. 29, 1975, Ser. No. 617,795

Claims priority, application Germany, Sept. 27, 1974, 2446783; Dec. 3, 1974, 2457541

Int. Cl.² F16L *15/00*

U.S. Cl. 285—110 **7 Claims**



1. In a joint between a pin tubing or casing member and a box casing member in oil filed equipment or the like, wherein each of the members has two, axially spaced threaded portions for threaded engagement with the respective two threaded portions of the respective other member, a radial step defining transition zone between the two threaded portions for the two members, comprising:

an annulus of one of said members extending axially between the two threaded portions of the one member, leaving a radial recess between the annulus and a portion of the one member as continuing into one of the threaded portions, the annulus having a radially outwardly bulging surface portion and an axial end face, the other one of the members having a non-complementary surface portion in the step zone, but ahead of a radial step proper of said other member in said zone for metallic engagement with said bulging surface portion of the annulus, the bulging portion rolling on said non-complementary surface portion upon engagement, the other member further having a complementary face serving with said axial end face as thread stop.

4,009,894

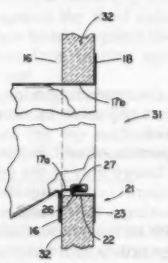
FITTING FOR INSULATED DUCT

Ralph L. Marquette, and James E. Jones, both of Indianapolis, Ind., assignors to Mutz Corporation, Indianapolis, Ind.

Filed Jan. 16, 1976, Ser. No. 649,789

Int. Cl.² F16L *41/00*

U.S. Cl. 285—183 **3 Claims**



1. A tubular fitting assembly adapted for end-to-side panel attachment to a duct whose side panels are formed of relatively thick but somewhat fragile thermal insulating material and which has a generally rectangular aperture cut therein to receive the fitting, said assembly comprising a tubular body having a rectangular end portion inserted into the duct aperture, said end portion being defined by a flange extending outwardly around three sides of the rectangular perimeter of the fitting and spaced from the end margin of the fitting by a distance substantially equal to the duct panel thickness adjacent the duct aperture so that said flange bears against the outer face of the duct panel, an integral tab extending outwardly from the end margin of the section of said end portion forming the fourth side of the rectangular perimeter of the fitting so as to closely overlie the adjacent inner face of the duct panel, and a member which is generally L-shaped in cross-section, one of its leg portions being formed to receive and hold a section of the marginal area of the inserted portion of the fitting, said member being manually applied to the fitting margin by access through the tubular fitting after it has been inserted in the duct aperture, and said member being positioned diametrically opposite said tab with the other of its leg portions closely overlying the adjacent inner face of the duct panel to thereby secure the fitting to the panel.

4,009,895

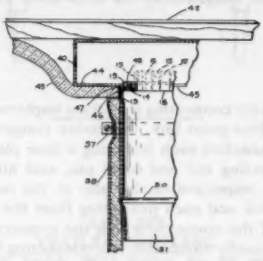
KNOCK-DOWN DUCT COLLAR

Nick J. Koskolos, Affton, Mo., assignor to Intertherm, Inc., St. Louis, Mo.

Filed Aug. 21, 1975, Ser. No. 606,537

Int. Cl.² F16L *41/00*

U.S. Cl. 285—189 **2 Claims**



1. A knock-down duct connector collar adapted for easy assembly within a rounded opening in a duct planar surface, comprising

a generally rectangular sheet metal workpiece having two opposite side edges, each of said side edges being bent back at **180°** from which margins extend, each of said margins having a first cut-out to provide a tab projecting endwise, one of its end edges being a duct-entrant edge, said workpiece being characterized in having along its outer end edge

an outer marginal portion extending to a closer parallel bend line, and an inner marginal portion extending therefrom to a farther inward parallel bend line, and bent in the opposite direction, together with

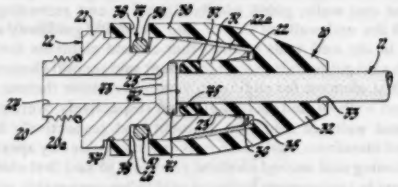
a plurality of second cut-outs extending from said end edge through both said marginal portions and narrowing to vertices at said farther bend line, thereby dividing both said marginal portions into segments, those segments between the two bend lines being trapezoidal, the total of the angles of their said vertices being at least 360°,

whereby on rounding the workpiece to form a collar with said bent-back margins on the inner side and bringing said edges into abutment and on joining said margins with a drive cleat, the tab on each said edge abuts the outer surface of the bent-back edge so brought into abutment with it thereby preventing the 180° bent edges from riding over each other when hoop compressive forces are applied, the said trapezoidal segments between said inner and outer bands form in effect a transverse planar inward flange which may be presented against the margin of such rounded duct surface opening, and the segments of the outer marginal portion form a nearly circular projecting flange of lesser diameter to be inserted through such rounded opening for bending back on the inside thereof.

4,009,896
QUICK CONNECT COUPLING

Robert W. Brewer, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed May 10, 1976, Ser. No. 685,042
Int. Cl.² F16L 37/00
U.S. Cl. 285—305 2 Claims

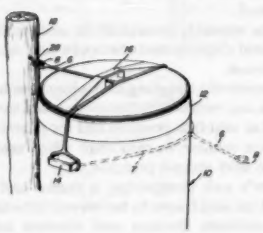


1. A quick connect coupling comprising in combination an adapter of tubular configuration having a stepped cylindrical opening therethrough defining at one end thereof a socket, a connector having body means at one end thereof defining an annular collar encircling a tubular plug and forming therewith a cavity to slidably receive one end of said adapter with said tubular plug slidably received in said socket of said adapter, a flexible tube slidably received by said tubular plug, said tube having an upset annular bead at one end thereof extending axially outward of said tubular plug in position to be encircled by said collar and receivable in said socket, an annular seal ring encircling said tube between said upset bead and the end of said tubular plug enclosed by said collar, said annular seal ring, when inserted into said socket, being radially compressed between an inner peripheral wall of said socket and the outer peripheral surface of said tube, said collar of said connector having diametrically opposed slots extending therethrough, said adapter having an annular groove on the outer peripheral surface thereof aligned with said slots in said connector when said connector is fully coupled relative to said adapter and, a spring retainer means encircling said connector, said spring retainer means having spaced apart leg portions loosely received in said slots for yielding engagement in said annular groove of said adapter.

4,009,897
GARBAGE CAN AND LID TIE DOWN APPARATUS

Michael P. Spellman, Rte. 1, E. Lake Ida, Alexandria, Minn. 56308

Filed Apr. 23, 1976, Ser. No. 679,665
Int. Cl.² B65D 45/30; E05C 19/18
U.S. Cl. 292—258 9 Claims

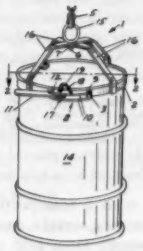


1. An integrally formed resilient tension strap constituting a hold down for garbage can lids and a can retainer, comprising a main stem having a loop formed at one end and bifurcated at the other end to provide two leg members each terminating in an elongated loop which leg members are adapted to be stretched across a garbage can lid and which elongated loops are adapted to encircle the side handles of a garbage can, the first loop and main stem may be threaded through the cover handle to the side opposite the leg extension to provide a three point hold down arrangement to prevent removal of the lid and upset of the can.

4,009,898
DRUM LIFTING ATTACHMENT

Harvie G. Hampton, 1863 S. Brookwood Drive, Shreveport, La. 71108

Filed Oct. 2, 1975, Ser. No. 618,821
Int. Cl.² B66C 1/18
U.S. Cl. 294—31.2 2 Claims



1. A drum lifting attachment comprising:

a. a drum collar shaped to substantially encircle a drum and having a first flange means and a second flange means fitted to the ends thereof, respectively;

b. a clamp lever having one end pivotally carried by said first flange means of said drum collar and the other end free, and a pair of clamp lock plates disposed in essentially parallel relationship, each of said clamp lock plates having one end pivotally carried by said second flange means of said drum collar and the othe end pivoted to said clamp lever;

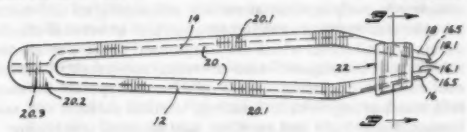
c. two lift straps attached to said drum collar and spanning a diameter of said drum collar, and disposed at essentially a 90° angle with respect to each other and coinciding at the approximate center of and above the circle defined by said drum collar; and

d. a lift ring pivotally secured to said lift straps at the coincidence of said lift straps.

4,009,899
WAFER TONGS

Douglas M. Johnson, Waconia, Minn., assignor to Fluoroware, Inc., Chaska, Minn.

Filed Oct. 16, 1975, Ser. No. 623,091
Int. Cl.² B25B 9/02
U.S. Cl. 294—33 10 Claims



1. Wafer tongs for gently but firmly grasping a delicate semiconductor wafer or the like, and comprising a pair of molded plastic resiliently joined handles terminating forwardly in normally spaced jaws arranged to grasp a wafer therebetween, the jaws having forwardly converging, confronting inner surfaces, an elongate stop carried by one of the jaws adjacent but spaced from its forward end and extending transversely of the jaws and entirely across the space between the jaws in position to contact the edge of a wafer to be grasped and to limit the distance to which the jaws may reach

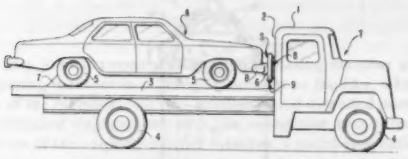
inwardly of the wafer edge, the elongate stop being in non-interfering relation with the other jaw to permit wide separation of the jaws, and the jaws being resiliently flexible at a location forwardly of the stop to bow and resiliently flatten against opposed wafer surfaces to provide surface-to-surface contact of the jaws with the wafer to distribute the grasping force of the jaws over a significant area of the wafer.

4,009,900

VERTICAL SNUBBER SHIPPING DEVICE

Thomas P. Didato, 32 Washington Ave., Middlesex, N.J. 08846

Filed Feb. 19, 1976, Ser. No. 659,406
Int. Cl.² B61D *3/16*, *43/00*; **B62D** *39/00*; **F16C** *15/00*
U.S. Cl. 296—1 A **24 Claims**



1. For combination with a transporting vehicle having a relatively horizontal carrying surface and a relatively vertical surface extending upwardly from said carrying surface and generally transversely to the line of travel of said transporting vehicle, and a transported vehicle supported on said transporting vehicle relatively horizontal surface and having an end member, the transporting vehicle being subject to vertical shocks during ground travel which are transmitted to the transported vehicle with consequent relative vertical movements between said vehicles occurring: a snubber for interpositioning between said transporting vehicle relatively vertical surface and said transported vehicle end member, said snubber comprising a first element for securing to said transporting vehicle relatively vertical surface; a second element mounted on said first element for vertical both up-and-down movements relative thereto and having a vertical surface engageable by the end member of a transported vehicle supported on said relatively horizontal surface of said transporting vehicle for establishing the relative positions of said vehicles in the direction of travel of said transporting vehicle; and means for cushioning the up-and-down movements of said second element relative to said first element, whereby said second element and said transported vehicle end member in engagement therewith will move up and down substantially in unison without undue vertical rubbing of said transported vehicle end member on said second element.

11. In combination, a transporting vehicle having a relatively horizontal carrying surface and a relatively vertical surface extending upwardly from said carrying surface and generally transversely to the line of travel of said transporting vehicle; a transported vehicle supported on said transporting vehicle relatively horizontal surface and having an end member, the transporting vehicle being subject to vertical shocks during ground travel which are transmitted to the transported vehicle with consequent relative vertical movements between said vehicles occurring: and a snubber interposed between said transporting vehicle relatively vertical surface and said transported vehicle end member, said snubber comprising:

a. a first element secured to said transporting vehicle relatively vertical surface;

b. a second element mounted on said first element for vertical both up-and-down movements relative to said first element and having a vertical surface engaged by said transported vehicle end member for establishing the relative positions of said vehicles in the direction of travel of said transporting vehicle; and

c. means cushioning the up-and-down movements of said second element relative to said first element, whereby said second element and said transported vehicle end member in engagement therewith all move up-and-down substantially in unison without undue vertical rubbing of said transported vehicle end member on said second element.

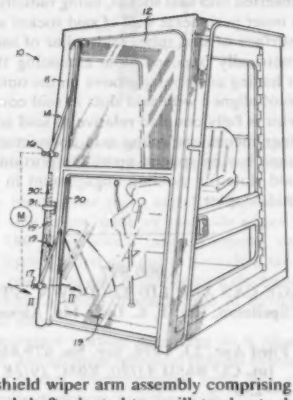
24. In a snubber, the combination of a first element comprising a panel having openings therein, two side walls, spaced end walls, and rollers mounted between said side walls and having portions projecting partially through said openings; a second element comprising a roller engageable part and spaced end walls; guide rods attached to and extending between the end walls of one of said elements; guideway apertures in the end walls of the other of said elements through which said guide rods extend to mount said second element on said first element for sliding movements relative thereto with the end walls of said second element respectively overlapping the end walls of said first element and respectively being spaced therefrom, said guide rods and said guideway apertures positioning said second element relatively to said first element to provide engagement between said roller engageable part of said second element with said projecting roller portions; and coil springs surrounding said guide rods and being respectively interposed between and engaging the overlapping end walls of said first and second elements.

4,009,901

DISCONNECT AND STORAGE MEANS FOR A WINDSHIELD WIPER ARM ASSEMBLY

Gail G. Barbee, Montgomery, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Aug. 27, 1975, Ser. No. 608,296
Int. Cl.² B60S *1/34*
U.S. Cl. 296—28 C **9 Claims**



1. A windshield wiper arm assembly comprising

an elongated shaft adapted to oscillate about a longitudinal axis thereof,

a wiper arm movably mounted on said shaft for selective longitudinal displacement between first and second positions thereon,

means for normally coupling said wiper arm to said shaft for simultaneous oscillation therewith when said wiper arm is disposed at said first position and for permitting said shaft to oscillate relative to said shaft when said wiper arm is moved to said second position,

an operator's cab comprising a frame and a windshield mounted on said frame to be moved between opened and closed positions thereon and wherein said wiper arm assembly is mounted on a side of said frame adjacent to said windshield,

clip means secured on the side of said frame for retaining said wiper arm in the second position thereof on said frame and remote from said windshield retaining means releasable mounted in a groove on said shaft and abutting an outboard end of said wiper arm to retain it in its first position

on said shaft, and

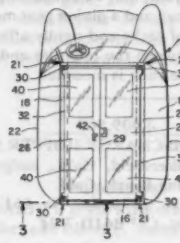
a second groove formed on said shaft in axially spaced relationship relative to said first-mentioned groove to retain said wiper arm in its second position.

4,009,902

CONVERTIBLE ROOF FOR A MOTOR VEHICLE

Robert Yoxtheimer, 177 Devoe Ave., Yonkers, N.Y. 10705

Filed Oct. 15, 1975, Ser. No. 622,759
Int. Cl.² B60J 7/10
U.S. Cl. 296—137 B **2 Claims**



1. A convertible roof for a motor vehicle having an opposed pair of sidewalls comprising:

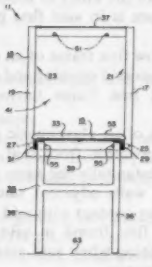
a rectangular opening in the roof of the vehicle; a pair of track means running generally vertically within the vehicle along said opposite sidewalls, said track means having upper extremes positioned along opposite sides of said roof opening; a pair of doors respectively mounted in said track means for enabling generally vertical movement of said doors, said doors being positionable along said track means and when so positioned having lower ends; pivot means carried on the lower ends of said doors; and means on the upper extremes of said track means for engaging said pivot means, said doors being dimensioned so that when said pivot means are engaged in the upper extremes of said track means, said doors can be rotated downward toward each other for closing the roof opening.

4,009,903

RETRACTABLE SEAT

Robert O. Manspeaker, 2160 Pendleton, Memphis, Tenn. 38114

Filed June 22, 1972, Ser. No. 265,172
Int. Cl.³ A47C 9/06
U.S. Cl. 297—14 **6 Claims**



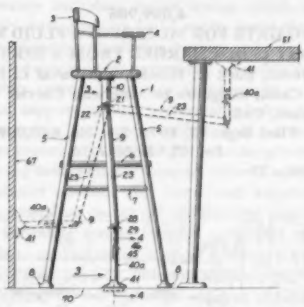
1. A retractable seat for movement between an open position and a closed, compact and out of the way position, said retractable seat comprising frame means for attachment to a vertical support, said frame means including first and second vertical members defining first and second vertical tracks, first and second bearing means respectively movably contacting said first and second vertical tracks, first and second arm means respectively attached to said first and second bearing means, a seat member attached to said first and second arm means, leg means pivotally attached to said first and second arm means and adapted to rest on a horizontal support when said retractable seat is in said open position; said first and second arm means with said seat member attached thereto and with said leg means pivoted into a substantially parallel and nesting relationship therewith being retractable from said open position to said closed position with said seat member being substantially flat against and parallel with the vertical support; said frame means including a top member, a bottom member and said first and second vertical members defining an open-centered rectangle, each of said first and second vertical members including a front member, a rear member and a side member defining a channel opening towards the center of said frame means and said front and rear members defining first and second vertical tracks, each of said first and second arm means including a top member and a side member defining a right angle opening towards the center of said frame means, and said first and second arm means with said leg means pivoted into said right angle substantially parallel to and nesting within said first and second arm means being retractable into said open-centered rectangle of said frame means by downward pivoting action and upward sliding action at said bearing means and said first and second vertical track means of said frame means.

4,009,904

SAFETY LEG FOR A CHAIR

Wesley E. Sheldon, 1835 - 31st St., Greeley, Colo. 80631

Filed May 21, 1975, Ser. No. 579,682
Int. Cl.² A47C 7/62
U.S. Cl. 297—217 **3 Claims**



1. In combination with a chair having a seat and downwardly extending legs to rest upon a floor and an anchoring surface adjacent to the chair,

a safety holding leg secured to the undersurface of said seat, with said leg having a top portion, an intermediate and a terminal portion,

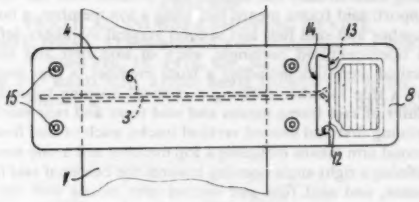
said safety holding leg including a first articulated joint near the undersurface of the seat to permit the intermediate leg portion, below the said top portion, to be angled laterally from the top portion, and including a second articulated joint remote from the undersurface of the seat to define the extended end of the intermediate portion, with said terminal portion extended beyond the end of the intermediate portion, to be angled with respect to the intermediate portion, whereby the safety holding leg can be shifted to various positions to permit the extended end of the terminal portion to reach and engage an anchoring surface, by a holding means carried by that end of the terminal portion, with said holding means being adapted to connect the terminal portion to the anchoring surface.

4,009,905

SAFETY BELT ACCESSORY

Désiré Jean-Marie Bejeannin, 12, rue Gai Sejour, Longchaumois - Jura, France

Filed Oct. 29, 1975, Ser. No. 626,874
Claims priority, application France, Oct. 30, 1974, 74.40157; Aug. 11, 1975, 75.25584
Int. Cl.² A62B 35/00
U.S. Cl. 297—385 11 Claims



1. In combination with an automotive seat belt, an apparatus comprising:

a housing securable to said seat belt,

at least one elongated blade displaceable in said housing across said seat belt, said blade reaching across said belt along one side thereof,

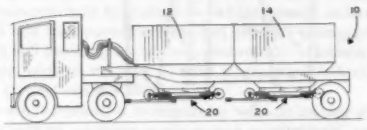
means having a displaceable actuating element and connected to said blade at one end thereof for drawing same completely across said belt on actuation of said element with a force exceeding a predetermined minimum level, said blade having at the opposite end thereof a cutting edge inclined to said belt and positioned to slice through the same when said blade is drawn across said belt.

4,009,906

METERING GATE FOR METERING A FLUID MATERIAL AS IT IS DISCHARGED FROM A HOPPER

Philip J. Sweet; Buck C. Hamlet, and David L. Sweet, all of Fresno, Calif., assignors to American Carrier Equipment, Inc., Fresno, Calif.

Filed Sept. 15, 1975, Ser. No. 613,055
Int. Cl.² B60P 1/56
U.S. Cl. 298—27 4 Claims



1. In combination with a hopper adapted to confine a fluid material including a vertically oriented discharge opening located in the bottom thereof, an improved metering gate for metering a fluid material as it is discharged from said hopper comprising:

A. means including a pair of closure panels arranged in coplanar relation for selectively closing said discharge opening;

B. means for supporting said pair of panels for rectilinear displacement in opposite directions along a pair of aligned linear paths including a pair of linear tracks extended in mutual parallelism along opposite sides of said discharge opening for receiving in supported relationship the opposite end portions of said closure panels;

C. drive means for simultaneously displacing said closure panels in opposite directions along said pair of paths including a first ram connected to one closure panel of said pair, and a second ram connected to the other closure panel of said pair;

D. motion balancing means interconnecting said closure panels for equalizing the distances through which said panels are displaced along said paths by said first and second rams;

E. a bell crank supported for oscillating displacement and a pair of connecting rods interconnecting the opposite arms of said bell crank with said pair of closure panels; and

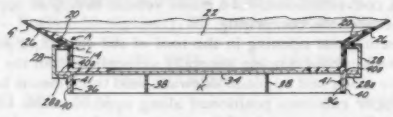
F. lag-elimination means interconnecting the opposite ends of each closure panel of said pair for equalizing the displacement imparted thereto by said drive means, comprising a rotatable drive shaft extended between the opposite ends of each of the panels, a pair of racks mounted on each panel of the pair of closure panels, near the opposite ends thereof, and extended in parallelism with the path of the panel, and a pinion gear meshed with each rack of said pair of racks and rigidly affixed to the drive shaft extended between the opposite ends of the closure panel on which the rack is mounted.

4,009,907

BOTTOM DISCHARGE HOPPER SEAL

Gary Lee Stanfill, Bakersfield, Calif., assignor to Midway Fishing Tool Co., Long Beach, Calif.

Filed Feb. 26, 1976, Ser. No. 661,484
Int. Cl.² B61D 7/04
U.S. Cl. 298—27 5 Claims



1. In combination with a rectangular hopper having a cover and a lower portion defined by two laterally spaced longitudinally extending walls that taper downwardly and inwardly towards one another, a forward wall that tapers downwardly and rearwardly, a rearward wall that tapers downwardly and forwardly, said walls at their lower extremities defining an opening through which granular material in said hopper may discharge by gravity, said longitudinally extending walls having two parallel guides of channel shape transverse cross section secured to the lower extremities thereof, a gate in the form of a rectangular plate slidably supported in said guides, said gate when in a first position completely closing said opening, said gate when in any one of a plurality of second positions allowing discharge of said granular material downwardly through at least a portion of said opening, means for sliding said gate longitudinally in said guides between said first position and any one of said second positions, a device for sealing and opening to prevent the entry of moisture or water therethrough when said gate is in said first position, said device including:

a. a four-sided hollow first frame of an elastomeric material that snugly engages said opening and extends downwardly therebelow, said first frame having upper and lower edges;

b. four first flanges of an elastomeric material that extend upwardly and outwardly from said upper edges of said first frame at substantially the same angle as the interior surfaces of said walls adjacent said opening, said first flanges in abutting contact with said surfaces and serving to support said first frame in said depending position through said opening when said gate is moved to one of said second positions;

c. a flat web of elastomeric material that extends between said lower edges of said first frame, said first frame of such depth that said web rests on said gate when the latter is in said first position, said web having a discharge opening therein through which said granular material in said hopper may discharge by gravity when said gate is in one of said second positions; and

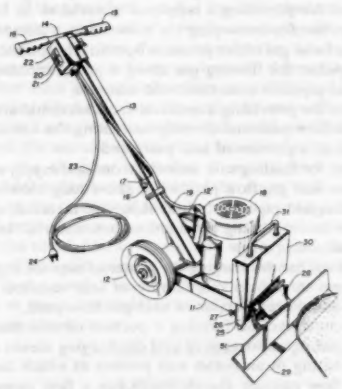
d. rigid reinforcing means embedded in said first frame and first flanges for preventing said first flanges being deformed relative to said first frame by the weight of said granular material on said web when said gate is in one of said second positions that said first frame, first flanges and web will be forced downwardly out of engagement with said hopper, said web due to the weight of said material thereon bowing downwardly when said gate is in one of said second positions, and said gate when it moves from one of said second positions to said first position slidably contacting the portions of said gate adjacent said guides on opposite sides of said discharge opening to force portions upwardly to horizontal positions where they rest on said gate; and the weight of said granular material in said hopper forcing said first flanges into sealing contact with the interior surfaces of said walls of said hopper and said web into sealing contact with said gate.

4,009,908

CARPET AND TILE STRIPPER

Gilbert L. Alinder, and Lloyd E. Anderson, both of Minneapolis, Minn., assignors to Taylor Manufacturing, Inc., City of Industry, Calif.

Filed Oct. 20, 1975, Ser. No. 623,902
Int. Cl.² A47L *11/12*
U.S. Cl. 299—37 **10 Claims**



1. A power operated carpet and tile stripping machine comprising:

a. a supporting frame;

b. motor means supported on said frame, said motor means including a cam means driven by said motor means;

c. a pair of wheels rotatably mounted to the rear portion of said frame;

d. a handle bar for guiding and maneuvering said machine attached to said frame;

e. cutting blade mounting head pivotably mounted to the forward portion of said machine on a shaft for partial rotation about an axis generally vertical to the floor, said head having the blade mounting portion thereof extending outwardly therefrom to form an acute angle with said floor; and

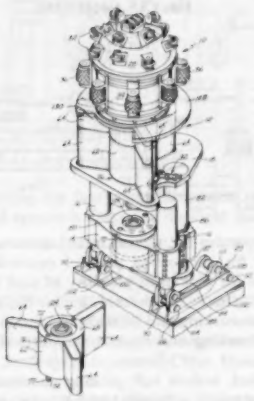
f. connecting means linking said cam means to said mounting head means so as to produce an oscillating arcuate motion of said head means.

4,009,909

UPWARD TUNNELING

Richard J. Robbins, Seattle, and Hans A. Adami, Vashon, both of Wash., assignors to The Robbins Company, Seattle, Wash.

Filed Jan. 10, 1975, Ser. No. 540,009
Int. Cl.² E21D *9/02*
U.S. Cl. 299—56 **21 Claims**



1. Mechanism for boring upwardly through ground material from an underground location, comprising:

a cutterhead assembly comprising a cutterhead support including a tail section which is directed downwardly during boring and rotary cutterhead means rotatably mounted onto said cutterhead support, said rotary cutterhead means including cutter means which is directed upwardly during boring and a rotary input shaft which is directed downwardly during boring; and

means for advancing said cutterhead assembly and rotating said rotary cutterhead means, comprising:

a sectional support column positionable below said cutterhead assembly, and connectable to said tail section;

thrust ram means positionable at the underground location for forcing said sectional support column upwardly to in that manner advance the cutterhead support and the rotary cutterhead means carried thereby, said thrust ram means including torque transfer connector means connectable to said sectional support column, for restraining said sectional support column against rotation during advancement of the sectional support column and the cutterhead assembly carried thereby;

a holding table positionable at the underground location above said thrust ram means, said holding table including means for securing said sectional support column to said holding table while a section is being added to or removed from it;

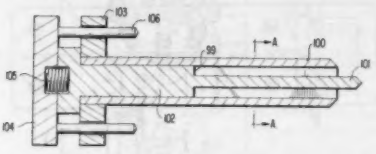
a rotary drive means carried by and movable with said thrust ram means, including a rotary output shaft; and

a separate rotary drive shaft section for each section of the support column, each of which is journaled for rotation inside of its section of the support column, each said rotary drive shaft section including joint means at its upper and lower ends, with the joint means at its upper end being detachably connectable to the input shaft of the rotary cutterhead means and the joint means at the lower end of each other rotary drive shaft section, and with the joint means at the lower end of each section being detachably connectable to the output shaft of the rotary drive means and the joint means at the upper end of each other drive shaft section.

4,009,910
TUFT FORMING DEVICE

John C. Lewis, Jr., Middlebury, Vt., assignor to Tucel Industries, Inc., Middlebury, Vt.

Continuation-in-part of Ser. No. 453,315, March 21, 1974, Pat. No. 3,910,637, which is a continuation-in-part of Ser. Nos. 186,659, Oct. 5, 1971, Pat. No. 3,799,616, and Ser. No. 154,055, June 17, 1971, Pat. No. 3,798,599. This application Oct. 10, 1975, Ser. No. 618,284
Int. Cl.² A46D 1/08
U.S. Cl. 300—2 10 Claims



1. In an apparatus for making tufted constructions including a stock box for supporting parallel cut-to-length synthetic fibers, means for picking a plurality of said fibers from said stock box to form a tuft thereof, means for heat-sealing and fusing the nonworking end of said tuft, and means for mounting the nonworking end upon a support, the improvement comprising:

an elongated, hollow tuft picking element having a fiber receiving opening therein and having a preselected, internal cross-sectional configuration, said element adapted to be inserted into said stock box through an aperture therein and to receive at least the end portions of the plurality of said fibers;

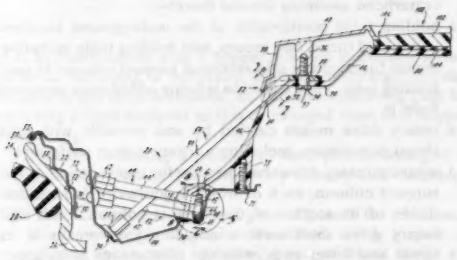
trim means disposed within said element for imparting a preselected trim configuration to the ends of the tufted form therein;

ejection means carried by said element for ejecting the hollow tuft formed from said element after the exposed end thereof is heat-sealed; means carried by said ejection means for forming a hollow tuft of unsupported fibers as said fibers are received in said element.

4,009,911
WHEEL TRIM AND METHOD

Frederick A. Apczynski, Livonia, Mich., assignor to Norris Industries, Inc., Ypsilanti, Mich.

Filed Mar. 7, 1975, Ser. No. 556,466
Int. Cl.² B60B 7/00
U.S. Cl. 301—37 SS 35 Claims

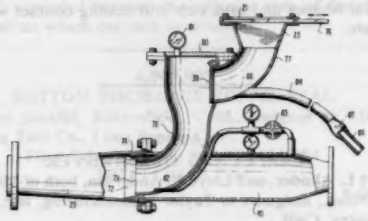


33. A wheel structure comprising a vehicle wheel having an outer face and a simulated wire wheel cover detachably secured to said outer face, said wheel cover having a plurality of rows of spokes positioned thereon with each of said rows of spokes having a plurality of spoke members, the improvment comprising a plurality of spoke sections forming each of the rows of spokes, each of said spoke sections comprising a plurality of spoke members connected at one end to an arcuately shaped base member, and means integral with at least one of said base members for spacing two of said rows of spokes from each other at their radially inner ends.

4,009,912
PNEUMATIC CONVEYING APPARATUS AND METHOD

Joseph Mraz, 501 E. Lee St., Plant City, Fla. 33566

Continuation-in-part of Ser. No. 520,943, Nov. 4, 1974, abandoned, which is a continuation-in-part of Ser. No. 327,640, Jan. 29, 1973, abandoned, and Ser. No. 193,630, Oct. 29, 1971, abandoned. This application Feb. 3, 1976, Ser. No. 654,796
Int. Cl.² B65G 53/14
U.S. Cl. 302—25 14 Claims



11. Apparatus for transferring large quantities of material in a gas stream at low power consumption rates and without the need for screw conveyor or rotary vane devices for introducing the material into the gas stream, comprising:

means for providing a supply of material to be handled;

a pipeline for conveying the material to a distant location;

a source of gas under pressure operatively connected to said pipeline for flowing gas along a path extending through said pipeline to entrain said material;

means for providing a reduced cross sectional area for said gas flow path and thereby increasing the velocity of said gas at a portion of said path; and

means for feeding said material from said supply of material into said gas flow path while preventing blowback of gas from said pipeline to said supply of material, said means for feeding being provided with a material flow passage and comprising:

means for discharging the material into the high velocity gas stream in the vicinity of said reduced cross sectional area portion of said gas flow path,

a chute section forming a portion of said material flow passage upstream of said discharging means and terminating in an outlet end portion at which the material flow passage therethrough has a first cross sectional area, said outlet end portion having an end wall extending around the periphery of the material flow passage therethrough,

a valve member mounted adjacent said outlet end of said chute section for swinging movement about an axis, said valve member having an upstream face of an area greater than said first cross sectional area for closing against said end wall of the outlet end portion of said chute section in one position and being movable about said axis in a downstream direction away from said end wall, and

means for providing on opposite sides of said valve member a first gas pressure differential when it is desired to feed material through said chute section and a second gas pressure differential at times of pipeline blockage events, said first and second gas pressure differentials being in opposite directions and being sufficient both to hold said valve member away from said chute section end wall when it is desired to feed material through said chute section and to close said valve member against said chute section end wall under pipeline blockage conditions to prevent blowback.

4,009,913
SUCTION NOZZLES FOR DRY-FISH OFF LOADING

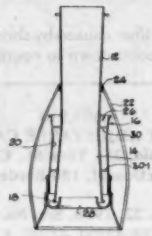
Frank Beugelink, Durbanville, South Africa, assignor to Aher Holdings S.A., Luxembourg, Luxembourg

Filed Apr. 30, 1975, Ser. No. 573,055

Claims priority, application South Africa, Sept. 26, 1974, 74/6135

Int. Cl.² B65G *53/42*

U.S. Cl. 302—58 **1 Claim**



1. A suction nozzle for use in handling fish, said suction nozzle comprising a tubular inner casing defining a chamber between top and bottom ends thereof, the top end forming an outlet having means for connection to a hose, a sleeve slidable on the outside of the tubular inner casing between the two ends thereof, a tubular outer casing of shorter length and larger diameter than the inner casing, said outer casing being spaced from the inner casing to form an annulus between the two casings and being positioned between the sleeve and the bottom end of the chamber, a collar fast with the bottom end of the outer casing, said collar having an inwardly-directed lip which extends partly into the interior of the tubular inner casing to form an aperture between opposite sides of the lip to define a first inlet into the chamber, as well as an annular space bounded by the lip and the collar as one wall and the tubular inner casing as the other wall, said annular space leading from the annulus between the inner and outer tubular casing into the chamber to define a second inlet into the chamber, said collar being attached by stays to the sleeve positioned on the outside of the tubular inner casing, thereby enabling the tubular outer casing and collar to be moved with respect to the tubular inner casing and so vary the cross-sectional area of the said annular space, and means for locking the sleeve to the tubular inner casing to enable the cross-sectional area of the second inlet to be adjusted to and locked at a predetermined value.

4,009,914
ALARM SYSTEM FOR A SKID CONTROL SYSTEM

Takefumi Sato, and Yuji Dohi, both of Tenri, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Mar. 11, 1975, Ser. No. 557,241

Claims priority, application Japan, Mar. 12, 1974, 49-28756; Apr. 3, 1974, 49-38337; Mar. 25, 1974, 49-34260[U]

Int. Cl.² B60T *8/00*

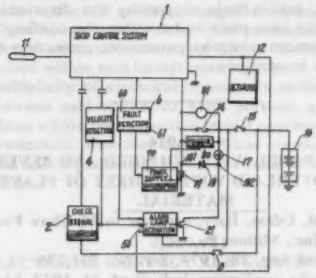
U.S. Cl. 303—92 **17 Claims**

1. In an alarm system for a wheeled vehicle including a power source, a skid control system for controlling brake pressure with the use of output signals from a wheel revolution sensor, a fuse for connecting the skid control system with the power source, and an indication unit, a combination comprising:

a dangerous fault condition detection unit connected to receive output signals from the skid control system;

a first switching means included within the dangerous fault condition detection unit for enabling the indication unit and tearing the fuse when the skid control system is placed in its dangerous fault condition;

a negligible fault condition detection unit; and a second switching means included within the negligible fault condition detection unit for enabling the indication unit



without tearing the fuse when the alarm system or the skid control system is placed in its slight fault condition.

4,009,915
SELF-LEVELING KITCHEN AND FOOD SERVICE EQUIPMENT

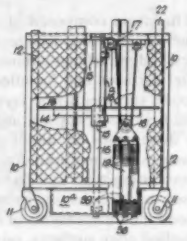
Alan Roy Whitelaw, 4A Warriston St., Brighton, Victoria, and Henry Alfred Jennings, 4 Scammell Close, Mount Waverley, Victoria, both of Australia

Filed Oct. 15, 1974, Ser. No. 515,054

Claims priority, application Australia, Oct. 16, 1973, 5257/73

Int. Cl.² A47F *1/06*

U.S. Cl. 312—71 **3 Claims**



1. A mobile dispenser of the type in which a stack of crockery, trays, glass ware, food serving equipment are stored with the top item to be dispensed at a substantially constant height relative to floor level comprising a frame or body, support plate means mounted relative to the frame or body, tension spring means having coils mounted on the frame or body, said support plate means guided by guide means for vertical slidable movement relative ive to the frame or body between a bottom and top position under the influence of said spring means, the total deflection of said spring means being less than the total movement of said support plate means between said positions, said spring means being mounted beside the path of movement of the support plate means, means including an adjusting plate disposed to engage each spring between a predetermined pair of said coils to adjust the spring deflection rate and a bolt extending longitudinally of the spring and being threaded in an opening in said adjusting plate to apply preload forces to said spring means to selectively adjust the position of the support plate means, the guide means including at least one vertical guideway mounted relative to the frame or body and including a linear motion ball bearing connected to the support plate means for maintaining the support plate means substantially in a horizontal plane irrespective of the loading on the plate means, a base in the dispenser supported on wheels, a well in the base extending between the wheels, the well adapted to accommodate said ball bearing and at least

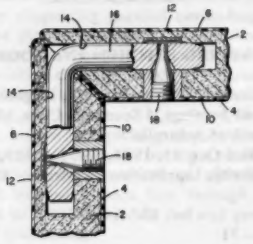
part of the support plate means when in its lowermost position whereby the space between the bottom and upper position of the support plate means is usable for goods to be handled by the dispenser, said wheels supporting the dispenser being mounted on the base plate to be within the confines of the dispenser perimeter whereby permanent projection beyond said perimeter is avoided.

4,009,916

CHIPCORE PANEL WITH ROUNDED AND BEVELLED EDGES OVERLAID WITH A SHEET OF PLASTIC MATERIAL

Marco Fantoni, Udine, Italy, assignor to McClure Furniture Industries, Inc., Milton, Pa.

Filed Aug. 28, 1974, Ser. No. 501,256
Claims priority, application Italy, Sept. 21, 1973, 83428/73
Int. Cl.² A47B *17/04*
U.S. Cl. 312—204 **4 Claims**



1. In an article of furniture composed of a plurality of panels, each of said panels comprising: first and second opposite major parallel surfaces; edge surfaces connecting said first and second major parallel surfaces and bevelled outwardly from said first to said second surface; a first layer of plastic sheet material fixed to said first major surface and trimmed to substantially the same dimensions as said first surface; and a second layer of plastic sheet material fixed to said second major surface and extending over and fixed to said bevelled edge surfaces; said second layer having substantially the same dimensions as the combined dimensions of said second major surface and said bevelled edge surfaces, said first and second layers being trimmed to meet at the intersection of said bevelled edge surfaces and said first major surface; wherein the bevelled edge surface of one of said panels lies adjacent a complementary bevelled edge surface of another of said panels such that the second major surfaces of the two panels face outwardly of said furniture article and the exposed edges of said panels are covered by said second layers of sheet material.

4,009,917

COMPRESSION STRESSED LINER FOR REFRIGERATION EQUIPMENT AND METHOD OF MAKING SAME

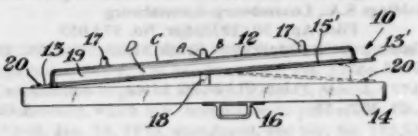
Edward H. Yonkers, and Wilford D. Harris, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 361,904, May 21, 1973, which is a continuation of Ser. No. 123,133, March 11, 1971, abandoned. This application Feb. 10, 1975, Ser. No. 548,501
Int. Cl.² B23P *11/02*
U.S. Cl. 312—214 **6 Claims**

1. A method for preventing tensile stress failure in an interior liner of refrigeration equipment comprising:

a. placing said liner in compressive stress; and

b. securely attaching said liner while maintaining said compressive stress to an outer shell portion in said refrigeration equipment thereby substantially counter-acting tensile stress in said liner caused by shrinkage of said liner as said equipment cools down to operating temperature.

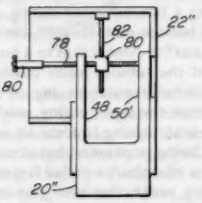


4,009,918

HEIGHT ADJUSTABLE CABINET

Kenneth A. MacDonald, 251 York St., Canton, Mass. 02021, and Edward J. MacDonald, 180 Border St., Scituate, Mass. 02066

Filed Jan. 22, 1976, Ser. No. 651,342
Int. Cl.² A47B *43/00, 48/00;* **F16M** *11/24*
U.S. Cl. 312—255 **8 Claims**



1. A height adjustable leg for use with cabinets or the like, comprising

a. a thin, flat and relatively fixed section having a floor-engaging lower edge adapted to be supported upright by a fixed horizontal surface,

b. a thin, flat relatively movable hollow housing section telescopically and vertically connected to said fixed section,

c. said movable section adapted to be connected to said cabinets,

d. movable mechanical advantage means operatively connected between said fixed and movable sections for selectively raising and lowering said movable section with respect to said fixed section,

e. said movable section generally corresponding in profile with the end walls of said cabinet and being substantially coextensive therewith,

f. the upper edge of said movable section being substantially level with the top of said cabinets, and,

g. connecting means at the rear portion of said leg for fastening said leg to a fixed vertical wall.

4,009,919

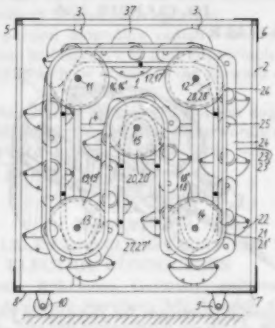
TRAVELING HOLDER FOR TEXTILE COILS

Hans Raasch, Rheydt, Germany, assignor to Schlafhorst & Co., Monchen-Gladbach, Germany

Continuation of Ser. No. 441,337, Feb. 11, 1974, abandoned. This application Aug. 20, 1975, Ser. No. 606,336
Claims priority, application Germany, Feb. 10, 1973, 2306688
Int. Cl.² A47B *49/00*
U.S. Cl. 312—268 **4 Claims**

1. Traveling holder for textile coils comprising a receptacle, and an elevator disposed in the interior of said rereptacle, said elevator comprising endless conveyor means having at least two adjacent runs extending in a wave-shaped loop along a substantially sinusoidal travel path within said receptacle for

maximum utilization of space within said receptacle, said endless conveyor means comprising a pair of endless conveyor chains, each having said two adjacent runs, and a multiplicity of troughs articulatingly suspended between said conveyor chains, said elevator further including endless stabilizing chains respectively connected to said conveyor chains and



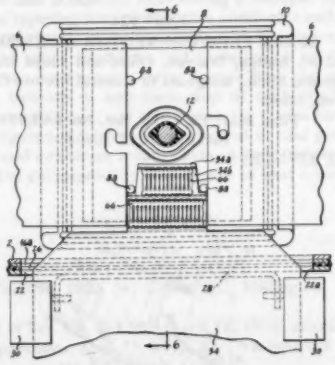
extending adjacent and in substantially parallel relationship thereto along the entire length thereof, and guide rails adjacent to said stabilizing chains, said stabilizing chains being in gliding engagement with said guide rails along said travel path so as to travel together with said conveyor chains simultaneously along said travel path.

4,009,920

POWER TAP-OFF UNIT FOR USE AT A SINGLE-BOLT JOINT IN A BUSWAY SYSTEM

Loy A. Hicks, Jr., Cedarburg, and Franklin R. Welch, Wauwatosa, both of Wis., assignors to Cutler-Hammer, Inc., Milwaukee, Wis.

Filed Apr. 26, 1976, Ser. No. 680,594
Int. Cl.² H01R 9/12
U.S. Cl. 339—22 B **10 Claims**



1. A branch connection for an electrical busway system comprising, in combination:

a first set of bus bars arranged in aligned correspondence with and longitudinally spaced from a second set of bus bars;

electrically conductive splice plates joining corresponding bus bars of said first and second sets, said splice plates being arranged in cooperative pairs disposed on opposite sides of respective corresponding bus bars;

means compressing said splice plates together upon said respective corresponding bus bars to form a rigid connection therewith, each connection establishing a lateral opening defined by the longitudinal space between the respective bus bars and by the associated pair of said splice plates;

branch connector plates arranged transversely to and in aligned correspondence with the bus bars of said first and second sets, said connector plates having portions received within said lateral openings; and

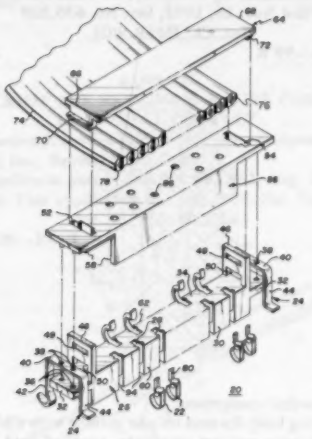
a multiplicity of electrical connectors resiliently disposed between said connector plate portions and said splice plates within the respective lateral openings, each of said connectors providing an electrical connection between said splice plates and respective ones of said connector plates.

4,009,921

ELECTRICAL CONTACT AND SUPPORT MEANS THEREFOR

Ronald S. Narozny, Panorama City, Calif., assignor to Thomas & Betts Corporation, Elizabeth, N.J.

Filed July 31, 1975, Ser. No. 600,825
Int. Cl.² H01R 9/08
U.S. Cl. 339—99 R **4 Claims**



1. An electrical connector comprising, in combination: a base member having an elongate body portion, a first end portion and a second end portion, said first and second end portions being located at opposite ends of said body portion, said body portion having a plurality of transverse contact receiving slots therein extending along the length of said body portion, a plurality of contacts, one for each of said contact receiving slots and seated therewithin, said contacts each having a head portion, a tail portion, and a web portion joining said head portion to said tail portion, said head portion and said tail portion extending from opposite surfaces of said body portion, said tail portion having a generally flat spiral configuration, a segment of said tail portion furthermost from said head portion extending outwardly from said body portion for engagement with a conductive surface, said contact receiving slots each having a selectively dimensioned tail receiving cavity having sidewalls and a bottom surface and communicating therewith, said tail portion of each of said contacts being partially contained within a respective one of said tail receiving cavities and deflectably movable from a first position wherein the free end of said tail portion is spaced from said bottom surface to a second position wherein the free end of said tail portion is caused to contact said bottom surface; means for securing said contacts in position in said body portion; and means for mounting said connector adjacent a conductive surface; said mounting means comprising a pair of generally U-shaped resilient metallic members each attached

to a respective one of said first and said second end portions of said base member, each of said U-shaped members comprising a pair of leg portions joined to one another by a first bridge portion attached to a respective one of said first and said second end portions of said body portion, at least one of said leg portions terminating in an outwardly facing foot portion arranged to extend through a transverse aperture in and engage the underside of a planar part upon which said connector is mounted.

4,009,922

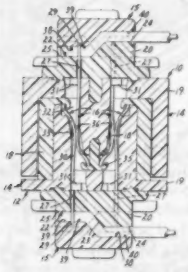
CONNECTOR

James E. Aysta, Stillwater, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Nov. 10, 1975, Ser. No. 630,220

Int. Cl.² H01R 9/08

U.S. Cl. 339—99 R **3 Claims**



1. A connector comprising:

an insulating body formed on one surface with a plurality of parallel wire support channels, each of said channels being formed with a transverse step defining upper and lower wire support levels, adjacent channels being formed with steps rising from generally coplanar lower wire support levels to generally coplanar upper wire support levels in opposite directions lengthwise of said channels to position a lower wire support level between two upper wire support levels, said body being formed with a plurality of apertures therethrough, one aperture extending across the lower wire support level of each said channel,

a plurality of spring compression reserve contact elements carried by said body, each contact having a bifurcate insulation stripping and conductor connecting end, a bifurcate contact connecting end of a contact element extending through each said aperture in said body to make electrical connection to a wire supported on a said lower wire support level and terminating below the adjoining upper wire support levels with the outer edges of the legs thereof abutting the adjoining upper support levels of said body,

a cover formed on one surface with parallel stepped wire support channels complementary to said channels on said body, and

means for retaining said cover on said body with said complementary channels aligned and the wires in the bifurcations of said contact elements to support and retain the wires in said channels and to make electrical connection between said contact elements and the wires.

4,009,923

CONNECTOR FOR SHIELDED ELECTRIC CABLES

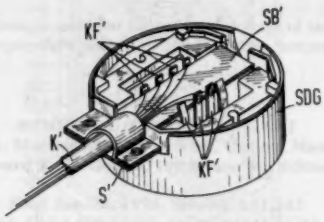
Olaf Aistleitner, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Nov. 4, 1975, Ser. No. 628,586

Claims priority, application Germany, Dec. 23, 1974, 2461282

Int. Cl.² H01R 3/06

U.S. Cl. 339—143 R **1 Claim**



1. An electrical connector for removably joining together first and second cables, comprising a plug member and a socket member, the plug member having a plurality of pins and the socket member having a corresponding plurality of sockets engageable with said pins, the pins and sockets extending substantially transversely of said cables, wherein each of said plug and socket members is adapted for use with a shielded cable having a lesser plurality of conductors, by said members each further comprising:

an electrically-conductive cable clamp connectable to a shield on a respective cable; and

an electrically-conductive, flat screening plate affixed to and extending along said member outwardly adjacent the respective pins or sockets and having electric contact with said cable clamp and with at least one of said pins and sockets,

whereby the cable screens are simultaneously removably joined together at said electrical connector with joining of the conductors of said cables.

4,009,924

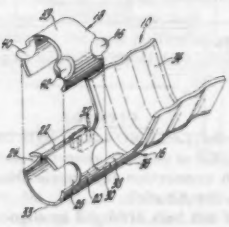
SPARK PLUG CONNECTOR ASSEMBLY

Edward M. Bungo, Warren, Ohio, and Lloyd D. Jack, Birmingham, Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Mar. 18, 1976, Ser. No. 668,031

Int. Cl.² H01T 13/04

U.S. Cl. 339—223 S **7 Claims**



1. A connector assembly for detachably connecting an ignition wire to a spark plug stud terminal comprising,

a terminal having an attachment portion at a rearward end for permanently attaching said terminal to an electrical wire and a barrel portion at a forward end for detachable connection to a stud terminal,

said barrel portion having a longitudinal split and at least one slot which is open at the forward end of the terminal

and which is circumferentially spaced from said longitudinal split, and

a C-shaped spring clip embracing said barrel portion and spanning said longitudinal split to inhibit expansion of said barrel portion in the circumferential direction,

said clip having a dimple portion at a forward end thereof disposed in said slot to limit rearward movement of said clip with respect to said barrel portion,

said dimple portion extending radially inwardly of said barrel portion and having a leading edge which is substantially coplanar with or ahead of the forward end of the terminal,

said clip further having a rearward portion engaging portions of said barrel portion spaced rearwardly of said slot to limit forward movement of said clip with respect to said barrel portion.

4,009,925

DETACHABLE CONNECTION BETWEEN TWO ELECTRIC CONDUCTORS

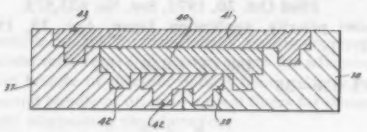
Frank Hoogeveen, Rohrmoos, Germany, assignor to Maschinenfabrik Augsburg-Nurnberg AG, Munich, Germany

Division of Ser. No. 560,912, March 21, 1975, abandoned. This application July 22, 1976, Ser. No. 707,782

Claims priority, application Germany, Mar. 27, 1974, 2414822; Aug. 16, 1974, 2439370

Int. Cl.² H01R 7/02

U.S. Cl. 339—273 R **14 Claims**



1. A detachable electrical connection comprising two electrical conductor ends to be connected, and a connector means fastened between said conductor ends, the cross-sectional dimension of said connector means being no larger than the corresponding cross-sectional dimensions of said conductor ends, each of said conductor ends having a multiple stepped configuration tapering toward the other conductor end, each step of each conductor end cooperating with the corresponding step of the other conductor end to define an axially extending groove, each groove being longer than the groove immediately beneath it, and each step of each conductor having a transverse bore, and said connector means having a stepped configuration corresponding to that of said grooves, each step of said connector means having a pin extending into the bore in the corresponding step of one of said conductor ends.

4,009,926

SOLDERLESS TERMINAL

Robert C. Tarrant, 2828 W. Genese St., Millington, Mich. 48746

Continuation of Ser. No. 461,953, April 18, 1974, abandoned. This application Aug. 15, 1975, Ser. No. 604,998

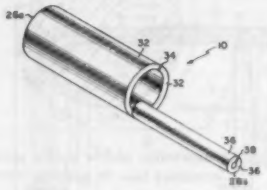
Int. Cl.² H01R 11/08

U.S. Cl. 339—276 T **6 Claims**

1. An electrical terminal comprising:

electrically conductive, conductor receiving crimpable cylindrical ferrule means, being of predetermined perimetrical length, and having a pair of opposed free edge portions in confronting relation with each other; and

male plug means for insertion into a complemental electrical receptacle, said plug means including an intermediate portion integral with a portion of said ferrule means interjacent said free edge portions, said male plug means including distal edge portions in confronting relation with each other and separated from said free edge portions by gaps on opposite sides of said intermediate portion to permit the free edge portions and distal edge portions to be freely and independently rolled into said confronting relation, the perimetrical length of said plug means being substantially less than the perimetrical length of said cylindrical ferrule means;



said male plug means comprising an additional hollow cylinder having a diameter substantially less than the diameter of said cylindrical ferrule means; said cylinder having an axial passage therethrough, the diameter of said passage being substantially less than the external diameter of said cylinder.

4,009,927

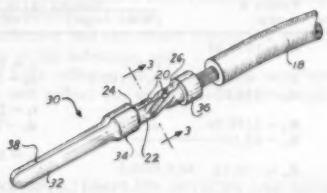
SPIRAL CRIMP FOR RETAINING A WIRE CONDUCTOR IN A METAL CONTACT

Robert Gordon Knowles, Litchfield, Conn., assignor to Litton Systems, Inc., Beverly Hills, Calif.

Continuation-in-part of Ser. No. 493,862, Aug. 2, 1974, abandoned. This application Oct. 21, 1975, Ser. No. 624,436

Int. Cl.² H01R 11/08

U.S. Cl. 339—276 T **6 Claims**



1. An electrical connector system comprising:

a pair of axially mating contacts, one having a male and one a female mating portion and each having a central portion and an open barrel portion joined to said male and female mating portions by said central portion;

said open barrel portion having a reduced outer diameter compared to said central portion for forming an indent receiving surface with a first shoulder formed between said central portion and said open barrel portion and an opposing second shoulder formed on the opposite end of said indent receiving surface;

wire conductor means received by said open barrel portion;

multiple opposed indents in said indent receiving surface of said open barrel portion for closing said indent receiving surface of said open barrel portion upon said wire conductor means;

said multiple opposed indents arranged at an angle to said contact axis, each indent long enough to deform an arc of said outer diameter of said indent receiving surface such that the full periphery thereof is deformed by said multiple indents; and

said multiple opposed indents each having a bottom surface that decreases in depth below said outer diameter of said indent receiving surface to tangentially and smoothly merge with said surface for forming a spiraling, stress-free crimp characterized by the absence of end shoulders.

4,009,928

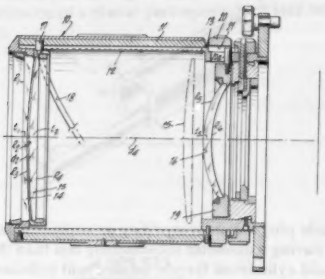
THREE ELEMENT VARIFOCAL LENS SYSTEMS

Frank G. Back, 55 Sea Cliff Ave., Glen Cove, N.Y. 11560

Filed June 27, 1975, Ser. No. 590,805

Int. Cl.² G02B *15/14*

U.S. Cl. 350—2 **1 Claim**



1. A long back focal length varifocal lens system comprising three air spaced lens elements disposed along the optical axis of the system formed of a material having a high infrared wave length transmission comprising in the order of the entrant light beam, a stationary negative front lens, a longitudinally movable positive inner lens element and a stationary positive back lens element in which the lens system has the following optical characteristics:

Lens No.	Radius R in mm	Thickness (t) Spacing (d) in mm (Wide Angle)	(Telephoto)
	$R_1 = 1504.24$		
14		$t_1 = 5$	$t_1 = 5$
	$R_2 = -476.17$	$d_2 = 102.0$	$d_2 = 2.35$
	$R_3 = 476.17$		
15		$t_3 = 7$	$t_3 = 7$
	$R_4 = 3159.56$	$d_4 = 5$	$d_4 = 104.65$
	$R_5 = 63.13$		
16		$t_6 = 5$	$t_6 = 5$
	$R_6 = -75.72$		
		EFL = 48.17	EFL = 97.725
		BFL = 65.92	BFL = 65.92

Material-Germanium-Refractive Index 4.003

4,009,929

BINOMIAL MICROSCOPE

Kuniomi Abe, Kobe, and Yuji Maekawa, Nishinomiya, both of Japan, assignors to Konan Camera Research Institute, Nishinomiya, Japan

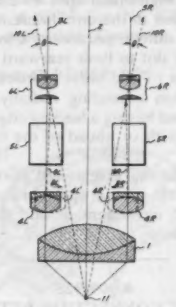
Filed Sept. 30, 1975, Ser. No. 618,058

Claims priority, application Japan, Apr. 24, 1975, 50-56684[U]

Int. Cl.² G02B *21/22*

U.S. Cl. 350—35 **1 Claim**

1. A binomial microscope comprising an auxiliary objective and a pair of optical systems having substantially parallel optical axes and being arranged in the rear of said auxiliary objective, each of said optical systems including an objective and an ocular, and said optical system further includes means for moving said objective in the direction substantially perpendicular to said optical axis while maintaining the remaining optical elements in fixed positions.



4,009,930

BINOMIAL MICROSCOPE

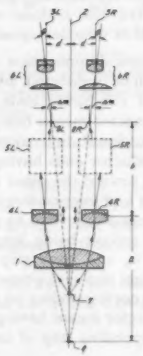
Kuniomi Abe, Kobe, and Yuji Maekawa, Nishinomiya, both of Japan, assignors to Konan Camera Research Institute, Nishinomiya, Japan

Filed Oct. 20, 1975, Ser. No. 623,575

Claims priority, application Japan, Apr. 23, 1975, 50-55922[U]

Int. Cl.² G02B *21/22*

U.S. Cl. 350—35 **1 Claim**



1. A binomial microscope comprising an auxiliary objective lens and a pair of optical systems having substantially parallel optical axes and being arranged in the rear of said auxiliary objective, each of said optical systems including an objective lens, an erect prism and an ocular, wherein said optical system further includes means for moving the last said objective lens in a direction substantially parallel to said optical axis while maintaining the remaining optical elements in fixed positions.

4,009,931

OPTICAL WAVEGUIDE CONNECTOR

Marc W. Malsby, Lake Arrowhead, and Kenneth M. Clark, Beaumont, both of Calif., assignors to The Deutsch Company Electronic Components Division, Banning, Calif.

Division of Ser. No. 452,837, March 20, 1974, abandoned. This application May 8, 1975, Ser. No. 575,977

Int. Cl.² G02B *5/16*

U.S. Cl. 350—96 C **4 Claims**

1. A connector for optical waveguides comprising a first means,

a second means,

a first bundle of a plurality of discrete optical fibers,

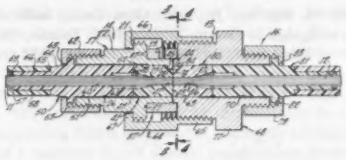
a second bundle of a plurality of discrete optical fibers,

said first means having an opening of predetermined size and shape, dimensioned and proportioned to receive a predetermined number of said fibers in abutting relationship with said fibers in predetermined positions in said opening,

said second means having an opening of the same size and shape as said opening in said first means,

each of said bundles of discrete optical fibers containing said predetermined number of fibers, said first bundle of discrete optical fibers being received in said opening in said first means, said second bundle of discrete optical fibers being received in said opening in said second means,

connecting means for connecting said first and second means together with said first and second bundles of discrete optical fibers substantially in end-to-end alignment,



adjustable means for rotationally positioning said first means relative to said second means for adjusting said first bundle of discrete optical fibers relative to said second bundle of discrete optical fibers for minimizing light attenuation therebetween,

said adjustable means including an element rotatable about a portion of said first means,

said portion of said first means having a cylindrical surface, said element being a sleeve circumscribing said surface, and having projecting portions engaging said second means for coupling said element to said second means for rotation therewith,

said second means having slot means therein, said projecting portions of said sleeve including lugs received in said slot means,

and means for selectively locking said element to said first means for preventing said element from rotating relative to said first means.

4,009,932

COMPOSITE OPTICAL FIBER ELEMENT FOR TELECOMMUNICATION CABLES

Antonio Ferrentino, Monza (Milan), Italy, assignor to Industrie Pirelli S.p.A., Milan, Italy

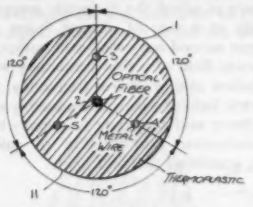
Continuation-in-part of Ser. No. 468,765, May 10, 1974. This application July 25, 1975, Ser. No. 598,753

Claims priority, application Italy, Aug. 2, 1974, 25886/74

Int. Cl.² G02B *5/16*

U.S. Cl. 350—96 B **13 Claims**

1. A composite optical fiber element comprising a light-transmitting optical fiber and at least three continuous, reenforcing filaments embedded in and surrounded by a synthetic thermoplastic resin, said filaments being made of a material having a modulus of elasticity at least equal to the modulus of elasticity of said fiber, being spaced from and around said fiber, being substantially parallel to said fiber and respectively lying substantially in planes parallel to and intersecting said fiber and inclined with respect to each other at substantially equal angles, said filaments stiffening said element and absorbing the greatest part of the stresses when said element is subjected to bending whereby said filaments substantially



reduce the stress which would otherwise be applied to said optical fiber with bending of said element.

4,009,933

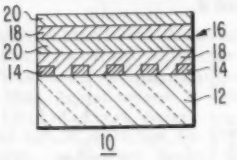
POLARIZATION-SELECTIVE LASER MIRROR

Arthur Herbert Firester, Skillman, N.J., assignor to RCA Corporation, New York, N.Y.

Filed May 7, 1975, Ser. No. 575,364

Int. Cl.² G02B *5/30*

U.S. Cl. 350—152 **8 Claims**



1. A polarization-selective laser mirror comprising:

an optical substrate;

a light reflective and electrically conductive grating on one surface of the substrate; and

a partial light reflector on the substrate over the grating which will reflect the same wavelength of light as the grating.

4,009,934

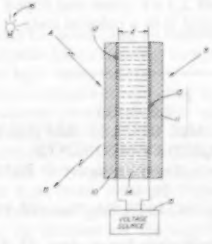
ELECTRO-OPTIC DISPLAY DEVICES AND METHODS

Robert M. Goodwin; Richard T. Klingbiel, and Hermann K. Bucher, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 432,717, Jan. 11, 1974, abandoned. This application June 28, 1974, Ser. No. 478,990

Int. Cl.² G02F *1/13*

U.S. Cl. 350—160 LC **11 Claims**



1. A method of scattering incident light comprising the steps of:

1. illuminating a liquid crystalline composition

a. having a positive, zero frequency dielectric anisotropy,

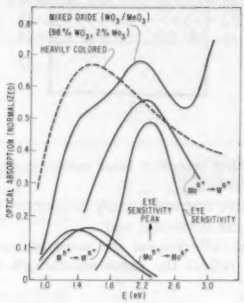
b. exhibiting a dielectric loss in the component of permittivity parallel to the optic axis of said composition, and
c. exhibiting a dielectric anisotropy inversion when subjected to an electric field greater than the crossover frequency at which the dielectric anisotropy is zero;

2. alternately at a rate of change faster than about 20 changes per second subjected said composition to
a. an electric field of a first frequency within the audio range below said crossover frequency, and
b. an electric field of a second frequency within the audio range above said crossover frequency to provide transient molecular reorientation of said composition thereby scattering incident light.

4,009,935
ELECTROCHROMIC DEVICE HAVING A DOPANT THEREIN TO IMPROVE ITS COLOR CENTER ABSORPTION CHARACTERISTICS

Brian Wilfred Faughnan, and Richard Seely Crandall, both of Princeton, N.J., assignors to RCA Corporation, New York, N.Y.

Filed July 11, 1975, Ser. No. 595,286
Int. Cl.² G02B *5/23*
U.S. Cl. 350—160 R **17 Claims**



1. In an electrochromic display device of the type having a substrate, a first electrode on the substrate, a layer of electrochromic material on the first electrode, an electrolyte on the layer of electrochromic material, and a second electrode on the electrolyte, wherein the improvement comprises:

said layer of electrochromic material including less than about 50% of a dopant by atomic weight such that the natural color center absorption peak of said layer of electrochromic material in a pure colored state is shifted upward in energy toward the ideal color center absorption peak of about 2.3 eV when said doped layer of electrochromic material is in a colored state.

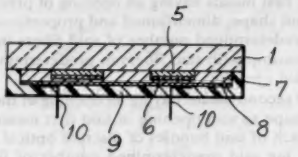
4,009,936
ELECTROCHROMIC DISPLAY DEVICE FREE OF LIQUID COMPONENTS

Yoshihiko Kasai, Suwa, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

Filed Aug. 19, 1975, Ser. No. 605,954

Claims priority, application Japan, Aug. 27, 1974, 49-95795
Int. Cl.² G02B *5/23*
U.S. Cl. 350—160 R **13 Claims**

1. A display device free of liquid components, comprising a solid electrochromic material, a solid electrolyte having electrical conductivity based at least in part on ionic conduction and making contact with said electrochromic material and electrodes making contact with said electrolyte and with said

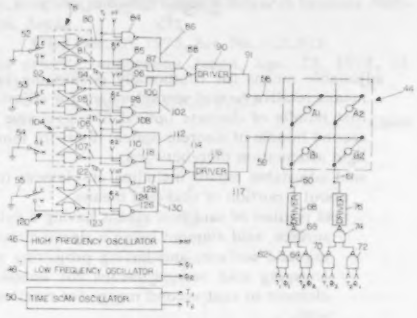


electrochromic material for activating said electrochromic material.

4,009,937
MULTIPLEX ADDRESSING OF COLLOIDAL LIGHT VALVES

Ellsworth M. Murley, Jr., and Allen Davis, both of Toledo, Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed Sept. 8, 1975, Ser. No. 611,032
Int. Cl.² G02F *3/16*
U.S. Cl. 350—160 R **8 Claims**



1. A method for operating a matrix of dimensions M×N, of a colloidal light valve material which is frequency responsive to exhibit greater light transmission in response to high frequency electrical signals than to low frequency electrical signals which comprises the steps of:

a. defining a matrix of a plurality of unique sites of dimensions M×N of said colloidal light valve material:
b. connecting each matrix site in each M row in series to a single input electrical conductor to thereby give a total of M row input conductors;
c. connecting each matrix site in each N column in series to a single input electrical conductor to thereby give a total of N column input conductors; and
d. multiplex addressing any selected M_i, N_j one of said matrix sites by the steps of:
i. individually supplying an individual M_i row or N_j column electrical conductor with a high frequency electrical signal and supplying the other of said M_i row and N_j column intersecting electrical conductors with a low frequency electrical signal during one time period and supplying both the M_i row and the N_j column electrical conductors with a low frequency electrical signal during another time period in a repeating cycle; and
ii. supplying non-selected sites in said M×N matrix with combinations of high frequency and low frequency electrical signals during said two time periods to force the average light transmission of said non-selected sites to be the compliment of the average light transmission of said M_i, N_j selected site.

4,009,938

LIQUID CRYSTAL DISPLAY DEVICE

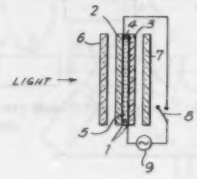
Yoshio Yamazaki, Shimosuwa; Toshihiro Suzuki, and Sadao Kanbe, both of Suwa, all of Japan, assignors to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

Filed Dec. 6, 1973, Ser. No. 422,373

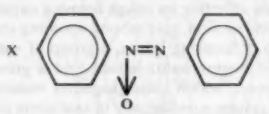
Claims priority, application Japan, Dec. 6, 1972, 47-122164

Int. Cl.² G02F 1/13; C09K 3/34

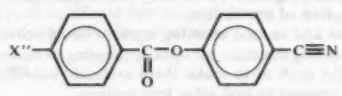
U.S. Cl. 350—160 LC **10 Claims**



1. A liquid crystal display device having a low-threshold voltage for altering the transit of polarized light therethrough comprising two opposed transparent plates, unidirectionally-oriented transparent electrodes on the inner faces of said plates, the directions of orientation of said electrodes differing by about 90°, said electrodes being connectable to a voltage source, polarizing filters disposed at the outer surfaces of said plates and a nematic liquid crystal composition between said plates, said composition comprising a first compound having the structural formula



where X and X′ are selected from the group consisting of alkyl radicals having 2–7 carbon atoms, alkoxy radicals having 1–2 carbon atoms and acyloxy radicals having 4–7 carbon atoms in the alkyl portions thereof and a second liquid crystal compound having the formula



where X″ is selected from the group consisting of alkyl radicals having 3–6 carbon atoms and acyloxy radicals and alkyl carbonate groups having 4–7 carbon atoms in the alkyl portions thereof.

4,009,939

DOUBLE LAYERED OPTICAL LOW PASS FILTER PERMITTING IMPROVED IMAGE RESOLUTION

Yukio Okano, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed June 3, 1975, Ser. No. 583,475

Claims priority, application Japan, June 5, 1974, 49-64221

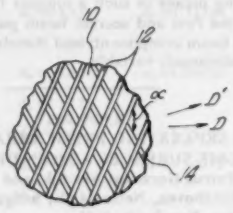
Int. Cl.² G02B 5/18; H04N 9/06

U.S. Cl. 350—162 SF **10 Claims**

1. An optical low pass filter for use in a color video system for monitoring an object scene having a color encoding striped filter for spatially modulating at least two selected primary color signals while passing a third luminance signal at a higher spatial frequency comprising:

a first phase retarding filter layer; and

a second phase retarding filter layer, and respective filter layers including a plurality of phase retarding grating stripes, the respective first and second stripes having a nonparallel alignment relative to each other and providing a combined optical transfer function value characteristic of preventing the transmittance of the high spatial frequency signal components of the two selected primary



colors while transmitting luminance signals at spatial frequencies above the cut off frequencies of the primary colors, the nonparallel grating stripes preventing spurious primary color signals not representative of the object scene while higher spatial frequency luminance signals are transmitted to provide an improved image resolution.

4,009,940

APPARATUS FOR PRODUCING OPTICAL INTERFERENCE PATTERN WITH CONTINUOUSLY VARIABLE FRINGE SPACING

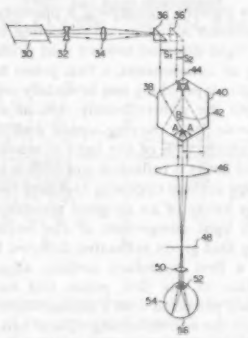
Hitoshi Ohzu, Hino, Japan, assignor to Takata Ophthalmic Instruments Co., Ltd., Tokyo, Japan

Filed Apr. 22, 1975, Ser. No. 570,920

Claims priority, application Japan, Apr. 27, 1974, 49-4904809

Int. Cl.² G02B 27/00; A61B 3/10

U.S. Cl. 350—163 **14 Claims**



1. Apparatus for producing an interference pattern of continuously variable fringe spacing, comprising:

a coherent light beam source;

a plane semi-transparent reflecting means;

first and second prisms, the bases of the first and second prisms being parallel to the semi-transparent reflecting means and disposed closely adjacent to the opposite sides thereof, the beam source being arranged to radiate a coherent light beam onto the first prism at an angle so that the coherent light beam is refracted by the first prism so as to be incident on the semi-transparent reflecting means at a predetermined angle and split by the semi-transparent reflecting means into first and second beam components, the first beam component being reflected by the semi-transparent reflecting means and refracted by the first prism into a first beam path parallel to the semi-transparent reflecting means, the second beam compo-

nent passing through the semi-transparent reflecting means and being refracted by the second prism into a second beam path parallel to the first beam path; and

beam converging means to converge the first and second beam components to overlap and produce an interference pattern, the beam source being operative to displace the coherent light beam relative to the semi-transparent reflecting means in such a manner that the spacing between the first and second beam paths of the first and second beam components and thereby the fringe spacing are continuously variable.

4,009,941

COLOR-SEPARATING PRISM ARRANGEMENT OF WHICH SOME SURFACES ADJOIN DICHROIC LAYERS

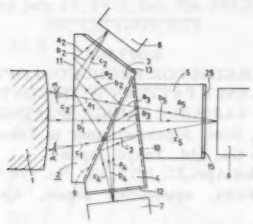
Leonardus Petrus Gerardus Verdijk, and Engbert Tienkamp, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 6, 1975, Ser. No. 538,719

Claims priority, application Netherlands, Jan. 7, 1974, 7400148

Int. Cl.² G02B *27/10*

U.S. Cl. 350—173 **4 Claims**



1. An optical system for tri-color separation for use in a color television camera comprising a plurality of prisms arranged in succession along a non-reflecting optical axis for separating the light directed toward said prism arrangement into a plurality of components, a first prism having a green-reflective dichroic layer along one boundary surface forming a given angle with the non-reflecting optical axis, said green reflective dichroic layer having upper and lower limits of reflectivity at which 50% of the light at wave-lengths corresponding to said limits is reflected and 50% is transmitted to a second boundary surface opposing said first boundary surface and adapted by virtue of an air-glass transition to totally reflect the green light component of the impinging light reflected back by said green reflective dichroic layer, a second prism having a first boundary surface adjacent said first boundary surface of the first prism and having a second boundary surface provided with a second dichroic layer forming an angle with the non-reflecting optical axis opposed to the angle formed by the first dichroic layer for separating the red light component from the blue light component in the light transmitted through said first dichroic layer, said first boundary surface of said second prism adjacent to said first boundary surface of the first prism being adapted by virtue of the air-glass transition to totally reflect the light component reflected back by the second dichroic layer, said second dichroic layer having upper and lower limits of reflection at which 50% of the light at wavelengths corresponding to said limits is reflected and 50% is transmitted, one of said upper and lower limits of reflection of the second dichroic layer substantially equaling the other corresponding limit of reflection of the first layer, said second dichroic layer having a transmission band with a secondary reflection peak for green light whereby a portion of the green light component transmitted by the first dichroic reflector is respectively transmitted and reflected by the second dichroic layer to compensate for increased sensitivity of the camera tubes to green light.

4,009,942

ZOOM LENS DEVICE

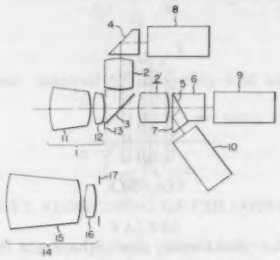
Ryusho Hirose, Machida, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed May 1, 1975, Ser. No. 573,562

Claims priority, application Japan, May 9, 1974, 49-51493

Int. Cl.² G02B *15/06*

U.S. Cl. 350—184 **8 Claims**



1. A zoom lens comprising:

a first zooming section having a predetermined value of aberration affecting its image forming capability, said first zooming section including a group of focusing lenses, a group of variator lenses and a group of compensator lenses, which lenses together reduce the aberration of the system substantially to said predetermined value;

a second zooming section having the same predetermined value of aberration affecting its image forming capability as said first zooming section, said second zooming section including a group of focusing lenses, a group of variator lenses, a group of compensator lenses, and a group of normally fixed lenses, which lenses together reduce the aberration of the system substantially to said same predetermined value; and

a relay lens section for forming a real image of an object from a light beam projected by said first or said second zooming section when optically coupled thereto and having lenses controlling the aberration of said relay lens section in such a way as to counteract aberration of said predetermined value resulting from said first or said second zooming section, whereby said real image is substantially free of aberration,

said first and second zooming sections being provided with supporting structure for optical coupling to said relay lens section such as to make them mutually interchangeable with respect to said relay lens section.

4,009,943

FISH EYE LENS SYSTEM

Mitsuaki Horimoto, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Aug. 20, 1975, Ser. No. 606,123

Claims priority, application Japan, Sept. 5, 1974, 49-102571

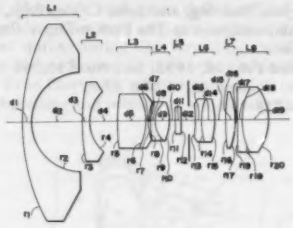
Int. Cl.² G02B *13/04*

U.S. Cl. 350—207 **18 Claims**

1. A fish eye lens system having a diaphragm on its optical axis and an object and image side to the lens system comprising:

a first lens group positioned on the object side of the diaphragm including a first negative meniscus lens having a convex surface on the object side, a second negative meniscus lens having a convex surface on the object side, a third negative doublet lens having a concave surface on the image side and a fourth positive lens having a convex surface on the object side, the concave surface of the third lens and the convex surface of the fourth lens forming a space of positive meniscus shape therebetween; and

a second lens group positioned on the image side of the diaphragm including at least three lenses of which two of



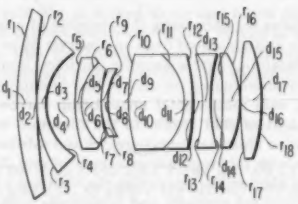
the lenses are doublets composed of positive and negative components.

4,009,944

MINIATURE AND LARGE APERTURE RETROFOCUS WIDE-ANGLE LENS

Yasuo Takahashi, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 21, 1975, Ser. No. 606,676
Claims priority, application Japan, Aug. 23, 1974, 49-96911
Int. Cl.² G02B *13/04*
U.S. Cl. 350—214 **2 Claims**



1. A miniature and large aperture retrofocus wide-angle lens comprising ten lenses forming eight components wherein the radii of curvature r_1 to r_{18}, the lens thicknesses and the lens separations d_1 to d_{17}, the refractive indices n_1 to n_{10}, and Abbe numbers ν_1 to ν_{10} of said first to tenth lenses L_1 to L_{10}, respectively, satisfy the following conditions:

$$F = 100$$

$$F_{1\cdot2\cdot3\cdot4\cdot5} = -\frac{F}{1.294} = -77.28$$

$$F_{1\cdot2\cdot3\cdot4\cdot5\cdot6\cdot7} = \frac{F}{0.538} = 185.87$$

$$\Sigma_P = 0.126$$

$$f_B = 1.618F$$

where F is the composite focal length, Σ_P is the Petzval sum and f_B is the back focal length

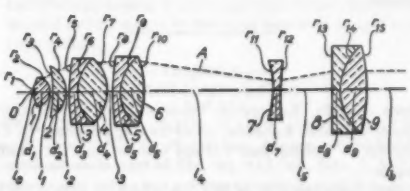
Lens L	Radius of Curvature r	Lens Thickness or Spacing d	Refractive Index n	Abbe No. ν
L_1	$r_1 = 69.94$	$d_1 = 16.33$	$n_1 = 1.80610$	$\nu_1 = 40.9$
	$r_2 = 787.86$	$d_2 = 0.41$		
L_2	$r_3 = 103.54$	$d_3 = 6.12$	$n_2 = 1.73400$	$\nu_2 = 51.5$
	$r_4 = 46.49$	$d_4 = 27.11$		
L_3	$r_5 = 147.79$	$d_5 = 4.98$	$n_3 = 1.78590$	$\nu_3 = 44.1$
	$r_6 = 48.09$	$d_6 = 15.68$	$n_4 = 1.71736$	$\nu_4 = 29.5$
L_4	$r_7 = 123.70$	$d_7 = 0.98$		
L_5	$r_8 = 80.02$	$d_8 = 4.82$	$n_5 = 1.78590$	$\nu_5 = 44.1$
	$r_9 = 55.52$	$d_9 = 17.72$		
L_6	$r_{10} = 133.60$	$d_{10} = 49.48$	$n_6 = 1.75700$	$\nu_6 = 47.9$
	$r_{11} = -53.07$	$d_{11} = 6.12$	$n_7 = 1.54072$	$\nu_7 = 47.2$
L_7	$r_{12} = -176.35$	$d_{12} = 7.47$		
L_8	$r_{13} = -144.49$	$d_{13} = 7.35$	$n_8 = 1.80518$	$\nu_8 = 25.4$
	$r_{14} = 178.09$	$d_{14} = 8.61$		
L_9	$r_{15} = -457.68$	$d_{15} = 14.92$	$n_9 = 1.61800$	$\nu_9 = 63.4$
	$r_{16} = -82.64$	$d_{16} = 0.73$		
L_{10}	$r_{17} = 571.54$	$d_{17} = 19.03$	$n_{10} = 1.56873$	$\nu_{10} = 63.1$
	$r_{18} = -123.54$			

4,009,945

MICROSCOPE OBJECTIVE

Walter Klein, Auf der Hohl 36,, Wissmar, Kreis Wetzlar, Germany

Continuation-in-part of Ser. No. 306,759, Sept. 5, 1963, Pat. No. 3,380,793. This application Sept. 1, 1967, Ser. No. 664,969
The portion of the term of this patent subsequent to Apr. 30, 1985, has been disclaimed.
Int. Cl. G02b *21/02, 9/62, 9/64*
U.S. Cl. 350—215 **2 Claims**



1. In a microscope objective, the improved optical system which consists of two groups of lenses

a first group of positive lenses positioned on the side of the object, and

a second group of lenses positioned on the side of the image,

the first group of lenses consisting, in the following order, of a thick negative meniscus front lens concave towards the object, said lens being effective to correct the image field curvature and positioned adjacent the object, a meniscus lens concave towards the object and having an axial thickness smaller than that of the preceding lens, both said lenses having positive refractive power, a first cemented doublet of a concavo-convex lens element, the concave side facing the object, the element being fitted to a biconvex lens on the convex side facing the object, a second cemented doublet of a concavo-convex lens element, the concave side facing the object, the element being fitted to a biconvex lens on the convex side facing the object,

the second group of lenses consisting of two lenses,

a biconvex negative lens positioned at an axial distance at least twice the focal length of the objective from the second doublet of the first group of lenses and a cemented doublet of a plano-concave lens element fitted to a biconvex lens element,

the lenses of the first group of lenses being effective to correct the aperture aberrations and the chromatic variation of the image and being positioned from each other at an axial distance smaller than the axial thickness of the preceding lens for correction of the isoplane condition, the biconvex negative lens and the doublet of the second group of lenses being positioned at an axial distance from each other at least twice the focal length of the objective.

4,009,946

IRIS LEAF FOR OPTICAL COMPONENT

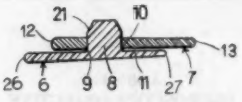
Hermann Geyer, Lengfeld, Wurzburg; Albert Baab, and Paul Himmelsbach, both of Bad Kreuznach, all of Germany, assignors to Jos. Schneider & Co. Optische Werke Kreuznach, Bad Kreuznach, Germany

Filed Feb. 21, 1975, Ser. No. 551,722

Claims priority, application Germany, Feb. 23, 1974, 2408793

Int. Cl.² G05D *25/00*

U.S. Cl. 350—266 **12 Claims**



1. An iris leaf for an optical component, comprising at least one curved foil of thermoplastic material with major surfaces bounded by a concave edge and a convex edge and with a stud rising integrally from at least one of said major surfaces, said stud broadening toward the body of the foil for maintaining a clearance between said one of said major surfaces and a confronting surface of an adjoining member articulated thereto by said stud.

4,009,947

REFLECTING MIRROR

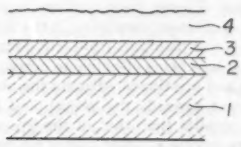
Keiziro Nishida, Kanagawa; Susumu Itoh, Tokyo, and Kathuhiro Konno, Kanuma, all of Japan, assignors to Canon Kabushiki Kaisha and Tochigi Canon Co., Inc., both of, Japan

Continuation-in-part of Ser. No. 440,028, Feb. 6, 1974, abandoned. This application Oct. 3, 1975, Ser. No. 619,526

Claims priority, application Japan, Feb. 15, 1973, 48-18538

Int. Cl.² G02B *5/08*

U.S. Cl. 350—288 **2 Claims**



1. A reflecting mirror comprising a glass base body, a reflecting silver layer formed on the surface of said glass base body, and a protective layer alloy composed of 30 to 70 percent by weight copper and 70 to 30 percent by weight tin being formed on the surface of said reflecting layer opposite to said glass body.

4,009,948

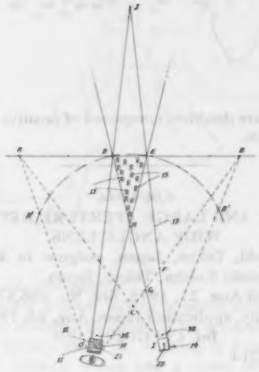
APPARATUS FOR ENHANCING VISIBILITY IN FOG OR UNDERWATER

Gerard E. Boyan, Redding, and John L. Rawlings, Westport, both of Conn., assignors to The Perkin-Elmer Corporation, Norwalk, Conn.

Filed Feb. 18, 1975, Ser. No. 550,268

Int. Cl.² G02B *27/17*

U.S. Cl. 350—319 **6 Claims**



1. Apparatus for enhancing the visibility of a region that is at a distance and separated from an observer by an intervening medium containing light scattering particles, comprising:

means for illuminating successive incremental areas of said region, said incremental areas being narrow relative to the extent of said region in the direction in which the successive illumination progresses and substantially coextensive with said region transversely of said direction; and

a viewing element for restricting the observer's field of view to correspond spatially and temporally with the successively illuminated areas of said region, said viewing element being displaced from said illumination means in said direction in which successive illumination progresses, said viewing element including:

a. a plurality of plates arranged in spaced parallel relation to form a plurality of slots defining the field of view of the observer and

b. means for directing said field of view to the successively illuminated areas of said region while maintaining the spaced parallel relation between said plates to cause said field of view to scan across said region contemporaneously with the progression of illumination of said incremental areas, thus enhancing visibility of said region by limiting the illumination back scattering reaching the observer.

4,009,949

THREADING AND SYNCHRONIZATION SYSTEM FOR SOUND MOTION PICTURE PROJECTOR

Arthur E. Nupnau, Chicago, Ill., assignor to Bell & Howell Company, Chicago, Ill.

Continuation of Ser. No. 518,328, Oct. 29, 1974, abandoned. This application Oct. 30, 1975, Ser. No. 627,320

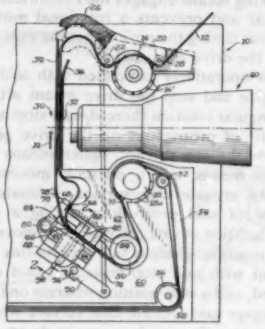
Int. Cl.² G03B *1/56*

U.S. Cl. 352—159 **3 Claims**

1. In a motion picture projector having a projection station, a sound station, a fixed film guide surface for guiding film along a film path connecting the projection station and the sound station, a leading sprocket for feeding film along the film path to said projection station, and a trailing sprocket for feeding film from said sound station, a sound and image synchronization system comprising:

a film threading path defining block fixed intermediate said projection station and said sound station relative to said fixed film guide surface to define a fixed threading path for guiding film from said projection station toward said sound station during film threading and film projection;

a throat recess formed in the surface of said block opposite said fixed film guide surface past which said film is move for threading and relative to which said film pulses during



transport to and through said sound station toward said trailing sprocket; and

a pulsation smoothing portion formed on said surface of said block proximate said throat recess in the direction in which said film is moved along said block during threading and against which said film is moved to isolate intermittent film movement as said film is transported from said projection station toward said sound station during projection.

4,009,950

MOTION PICTURE PROJECTION APPARATUS WITH FILM FEEDING SPEED CHANGING APPARATUS

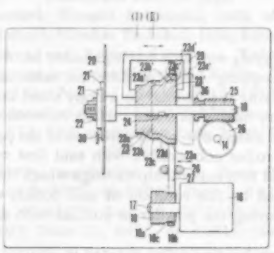
Kuniyoshi Suzaki, Machida, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 2, 1975, Ser. No. 538,163

Claims priority, application Japan, Jan. 8, 1974, 49-5507

Int. Cl.² G03B *1/00*

U.S. Cl. 352—166 **14 Claims**



1. In a motion picture projection apparatus, the improvement comprising:

1. a driving means having at least one AC motor which can use at least a first and a second power source having different frequencies,

2. a first rotary shaft rotated by said driving means,

3. a film feeding means,

4. a second rotary shaft co-working with said film feeding means, and

5. a power transmission correction means to transmit the rotation of said first rotary shaft to said second rotary shaft, being able to select rotational speeds of said second rotary shaft to prescribed values M_1 and M_2 and transmit the same even if said motor uses said first power source and the rotational speed of said first rotary shaft becomes S_1, and even if the motor uses said second power source and the rotational speed of said first rotary shaft becomes S_2, having:

having pulley means having the following integrally rotating with said rotary shaft:

a first pulley having a diameter dimension formed as r_1, and

a second pulley having a diameter dimension formed as r_2,

a second pulley means having the following integrally rotating with said second rotary shaft:

a first pulley having a diameter dimension R_1 formed as $R_1 = r_2M_1S_1$,

a second pulley having a diameter dimension R_2 formed as $R_2 = r_2M_1S_1 = r_1M_2S_1$, and

a third pulley having a diameter dimension R_3 formed as $R_3 = r_1M_2S_2$,

a power transmission belt means having at least one or more endless belt disposed in tension

a. between the second pulley of said first pulley means and the first pulley of said second pulley means when said motor uses said first power source and the rotational speed of said second rotary shaft is expected to be M_1;

b. between the first pulley of said first pulley means and the second pulley of said second pulley means when said motor uses said first power source and the rotational speed of said second rotary shaft is expected to be M_2,

c. between the second pulley of said first pulley means and the second pulley of said second pulley means when said motor uses said second power source and the rotational speed of said second rotary shaft is expected to be M_1, or

d. between the first pulley of said first pulley means and the third pulley of said second pulley means when said motor uses said second power source and the rotational speed of said second rotary shaft is expected to be M_2, and

a change over means to change over said tensioned position of said endless belt according to the type of the power source used by said motor and the rotational speed expected for said second rotary shaft, wherein said means can slidingly shift at least one of said endless belt and said second pulley means in the axial direction of said second rotary shaft.

4,009,951

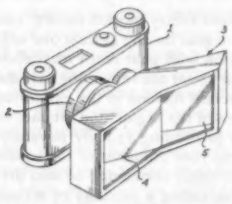
APPARATUS FOR STEREOSCOPIC PHOTOGRAPHY

James E. Ihms, 1569 W. Hazelwood, Phoenix, Ariz. 85015

Continuation-in-part of Ser. No. 412,760, Nov. 5, 1973, abandoned, which is a continuation-in-part of Ser. No. 375,335, July 2, 1973, Pat. No. 3,846,810. This application Dec. 26, 1974, Ser. No. 536,448

Int. Cl.² G03B *35/08, 35/18;* G02B *27/24*

U.S. Cl. 353—7 **51 Claims**



1. Apparatus for simultaneously combining a first non-color filtered image of an object and a second non-color filtered image of the object to form a non-anaglyph colored composite image having a three dimensional quality, said first and second images being received by said apparatus along first and second light ray paths, respectively, said first and second light ray

paths being angularly displaced from one another, said apparatus comprising in combination:

a. a light reflective means intercepting the first light ray path for reflecting said first image along a third light ray path to intersect said second light ray path;

b. color filter means for color filtering only one of said first and second images;

c. combining means disposed at the intersection of said second light ray path and said third light ray path for combining said second image and said reflected first image, said combining means being angularly oriented to transmit a part of said first image along an extension of said third path and to reflect the remaining part of said first image along an extension of said second path to become a portion of said composite image and to transmit a part of said second image through said combining means along said extension of said second path to become the remaining portion of said composite image and to reflect the remaining part of said second image along said extention of said third path; and

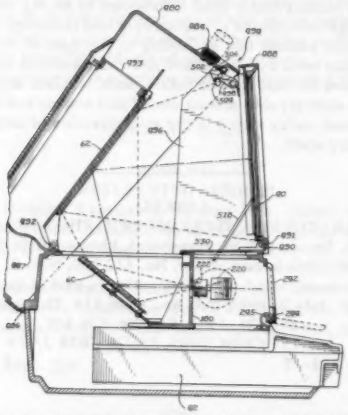
d. means for displaying said composite image; whereby, an interaction of light results at said combining means between the color filtered one and the non-color filtered one of said first and second images to produce said composite image formed of two non-mutually color exclusive colored images.

4,009,952

INTERMITTENT ROTARY MOTION DEVICE

Frank C. Badalich, Chicago, and George J. Pawl, Norridge, both of Ill., assignors to Bell & Howell Company, Chicago, Ill.

Filed Jan. 9, 1975, Ser. No. 539,875
Int. Cl.² G03B *23/08*
U.S. Cl. 353—109 **12 Claims**



1. An intermittent rotary motion device, comprising:

a rotatable drive gear having at least one segmental arcuate toothed portion with gear teeth thereabout, and a cylindrical surface about the remaining periphery of the drive gear and a detent formed in the cylindrical surface adjacent each end of the segmented arcuate toothed portion, said detents protruding radially inwardly a greater distance than the root diameter of the toothed portions;

drive means drivingly connected to said drive gear;

a driven gear including a plurality of arcuate toothed portions each of which is spaced apart by a cam locking means for engagement with the cylindrical surface of said drive gear to provide sliding lost motion therebetween, said cam locking means including a pair of spaced apart arcuate tip portions for engaging the cylindrical surface of the drive gear, the engaging tip portions protruding radially outwardly a greater distance than the gear teeth on the toothed portions of the driven gear so as to mesh and engage the detents of said drive gear adjacent the toothed portions thereof, whereby continued rotation of the drive gear by the drive means causes the toothed portion of said drive gear to sequentially engage one of the toothed portions of said driven gear to cause rotation thereof through an angle determined by the length of the toothed portions thereof whereafter the next adjacent cam locking means engages the cylindrical surface of the drive gear and prevents a rotational movement of the driven gear during the period that the cam locking means engages the drive gear; and

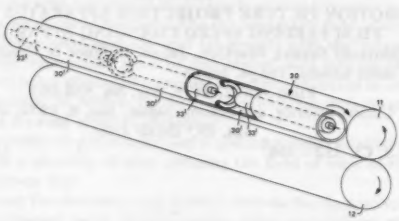
stop means operatively associated with said drive gear to de-energize and stop the drive means after a predetermined angular rotation thereof, said stop means comprising a pair of protrusions on the drive gear protruding parallel to the axis thereof, switch means to de-energize the drive means, and a pivotally mounted stop lever, having an arcuate cam surface alternately engageable with one of said protrusions during a predetermined angular rotation of said drive gear for movement between a drive position wherein said protrusions are out of engagement with said stop lever and said drive means is energized, and a stop position wherein one of said protrusions engage said arcuate cam surface whereby the stop lever actuates the switch means to de-energize the drive means.

4,009,953

FIXING UNIT FOR ELECTROSTATIC COPIERS

Martino Ravizza, and Giancarlo Abate-Daga, both of Turin, Italy, assignors to Ing. C. Olivetti & C., S.p.A., Torino, Italy

Filed Oct. 14, 1975, Ser. No. 621,715
Claims priority, application Italy, Nov. 6, 1974, 70256/74
Int. Cl.² G03G *15/00*
U.S. Cl. 355—3 R **3 Claims**



1. In a copying machine having means for making powder images on copying sheets of different selectable formats, a device for fixing the powder to a copy sheet comprising:

a first roller having its outer surface covered with a layer of material adapted to resist adhesion of the powder thereto;

a second roller cooperative with said first roller to define with said first roller a nip through which the copy sheet is advanced by the rotation of said rollers with the sheet face bearing the powder in contact with said first roller; and

at least one heating roller rotated in contact with said first roller for heating said layer to a temperature sufficient to cause fusing of the powder to the copy sheet, said heating roller comprising

a tube of good thermal conductive material having a plurality of axially adjacent cylindrical portions, each portion contactable with a different part of the periphery of the first roller and each portion having therein a heating unit, each heating unit selectively activatable in accordance with the selected format of the copy sheet for heating the corresponding part of the peripheral surface of the first roller, whereby for a selected format of the copy sheet only a corresponding part of said layer is heated.

4,009,954
ELECTROSTATIC COPIER

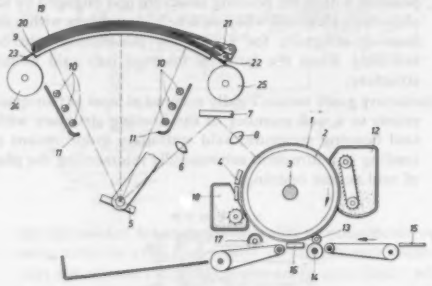
Gerhard Ritzerfeld, Schorlemer Allee 14, 1000 Berlin 33, Germany

Filed Sept. 11, 1975, Ser. No. 618,685

Claims priority, application Germany, Sept. 17, 1974, 2444941; Nov. 1, 1974, 2452429

Int. Cl.² G03G *15/00*

U.S. Cl. 355—7 **24 Claims**



1. In an electrostatic copier, a combination comprising a transparent support member having a support surface and an opposite surface; light source means for directing light against said opposite surface; pattern sheet holding means for holding on said support surface first pattern sheet means which defines an elongated gap and for also holding second pattern sheet means overlying said first pattern sheet means and provided with lines of indicia parallel to said gap; transporting means for transporting said second pattern sheet means stepwise relative to said first pattern sheet means in direction normal to said gap so as to expose succeeding ones of said lines in said gap; and third pattern sheet means intermediate said first pattern sheet means and said light source means and being provided with pattern portions, including moving means for moving different ones of said pattern portions into predetermined positions relative to said first and second pattern sheet means.

4,009,955
COPYING APPARATUS FOR SHEET ORIGINALS AND THICKER ORIGINALS

Shigehiro Komori; Hisashi Sakamaki, both of Yokohama; Hiroyuki Hattori, Mitaka; Toshihide Iida; Koichi Miyamoto, both of Tokyo, and Kazumi Umezawa, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 461,104, April 15, 1974, abandoned, which is a continuation of Ser. No. 258,820, June 1, 1972, Pat. No. 3,804,512. This application June 3, 1975, Ser. No. 583,247

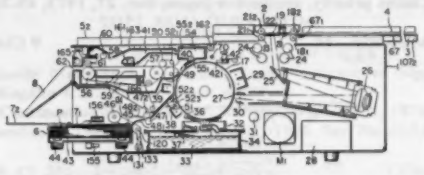
Claims priority, application Japan, June 9, 1971, 46-48632[U]; June 3, 1971, 46-38917; June 3, 1971, 46-38918; June 10, 1971, 46-41195; June 10, 1971, 46-41196; June 10, 1971, 46-41197; June 21, 1971, 46-44611; Aug. 30, 1971, 46-66740

The portion of the term of this patent subsequent to Apr. 16, 1991, has been disclaimed.

Int. Cl.² G03G *15/30*

U.S. Cl. 355—8 **2 Claims**

1. In a copying apparatus having an original carriage, means for reciprocating said original carriage, a photosensitive medium, an optical system for projecting an original image on said photosensitive medium, means for forming an image on said photosensitive medium, developing means, transfer means, means for feeding transfer mediums, means for conveying transfer mediums from said feed means to a discharge port, fixing means, and a housing for accommodating therein all of said means, comprising the improvement wherein said original carriage includes sheet original transport means integral therewith and having means for advancing a sheet original; said apparatus further comprising means for automatically reciprocating said original carriage, means for releasably



locking said carriage against reciprocating movement, and means for generating a start signal coupled to said original carriage for initiating reciprocal movement of said carriage upon release thereof when a thick original is to be copied, and for energizing said advancing means to advance said sheet original when a sheet original is to be copied.

4,009,956
ELECTROSTATIC OR XEROGRAPHIC COPYING OR DUPLICATING MACHINE WITH BUILT-IN ARRANGEMENT FOR CUTTING A SHEET ALONG A SELECTED LINE OR LINES

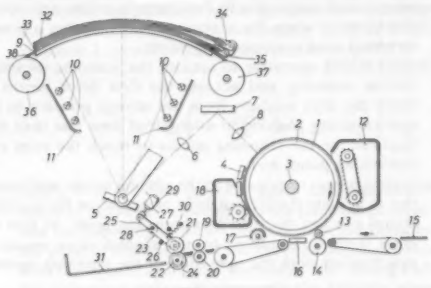
Gerhard Ritzerfeld, Schorlemer Allee 14, 1000 Berlin 33, Germany

Filed Sept. 11, 1975, Ser. No. 612,579

Claims priority, application Germany, Sept. 18, 1974, 2445153

Int. Cl.² G03G *15/00*; B23D *19/00*

U.S. Cl. 355—13 **5 Claims**

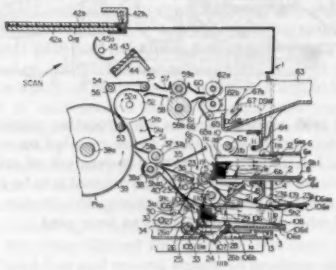


1. An electrostatic or xerographic copying or duplicating machine, comprising, in combination, supporting means for supporting an original to be copied in a predetermined position; a delivery station for copies; transport means for transporting a sheet of copying paper through the machine in a predetermined travel direction along a predetermined travel path and into said delivery station; copying means for illuminating the original and forming an image thereof on the sheet of copying paper as the latter travels along said path; cutting means arranged upstream of said delivery station, said cutting means comprising a plurality of cutter units spaced from each other in direction transverse to the sheet travel direction and each operative when activated for cutting the sheet along a respective one of a plurality of different cut lines each extending parallel to the travel direction as the sheet leaves said copying means and travels to said delivery station; and activating means operable by the user of the machine for activating said cutting means, said activating means comprising means for selecting the line along which the sheet is to be cut.

4,009,957
COPY PAPER FEED SYSTEM

Shigeru Suzuki; Minoru Iwamoto; Koichi Noguchi; Kyoji Omi, and Tatsuo Nishikawa, all of Tokyo, Japan, assignors to Ricoh Co., Ltd., Tokyo, Japan

Filed Nov. 7, 1974, Ser. No. 521,822
Claims priority, application Japan, Dec. 27, 1973, 49-2080
Int. Cl.² G03G *15/28, 15/32*
U.S. Cl. 355—14 **9 Claims**



1. An electrophotographic copying machine comprising, in combination:

scanning means for scanning an original document;

a seamless photoconductive member moving at constant speed and imaged by the scanning means,

first drive means for moving a copy medium from a storage position to a synchronizing position;

second drive means for moving the copy medium from the synchronizing position into contact with said photoconductive member to receive an image of the document produced by the scanning means, the image being transferred to the copy medium as the copy medium is moved in contact with the photoconductive member by the second drive means;

sensing means responsive to the scanning means and operative to sense when the scanning means reaches a predetermined scan synchronizing point;

control means operative to actuate the scanning means to initiate scanning and actuate the first drive means to move the copy medium from the storage position to the synchronizing position in a length of time less than that required for the scanning means to reach the scan synchronizing point; and

actuating means responsive to the sensing means and operative to actuate the second drive means when the scanning means reaches the scan synchronizing point, so that the copy medium is moved by the second drive means in synchronism with the operation of the scanning means.

4,009,958
BELT SUPPORT STRUCTURE IN COPYING MACHINE

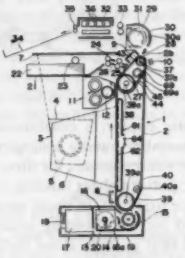
Takaji Kurita, Kawachinagano, and Takao Fujiwara, Sakai, both of Japan, assignors to Minolta Camera Kabushiki Kaisha, Azuchi, Japan

Filed Mar. 19, 1975, Ser. No. 560,091
Claims priority, application Japan, Apr. 20, 1974, 49-44754
Int. Cl.² G03G *15/00*
U.S. Cl. 355—16 **7 Claims**

1. A belt support structure in a photoelectrostatic copying machine comprising a housing structure having an access opening in a plane and adapted to be selectively closed and opened, said access opening leading into the interior of said housing structure in which necessary operating elements of the copying machine are arranged, which belt support structure comprises:

a photoreceptor belt assembly including a photoreceptor belt and first and second side plates and a plurality of rolls rotatably supported between said first and second side plates in spaced relation to each other, tension adjusting means for adjustment of tension imparted to said photoreceptor belt, said photoreceptor belt being suspended around said rolls, one of said rolls being adapted to be drivingly coupled to a source of driving force when said belt assembly is inserted into said housing structure, and said first side plate being situated remote from said access opening when said belt assembly is inserted into said housing structure and having alignment elements thereon, counter-alignment elements stationarily held in position within the housing structure and engaged by said alignment elements when said belt assembly is within said housing structure for accurately positioning said belt assembly when the latter is inserted into said housing structure;

stationary guide means rigidly secured at least at two spaced points to a wall member of the housing structure within said housing structure, said stationary guide means extending in a direction substantially intersecting the plane of said access opening;



intermediate guide means telescopically movably mounted on said stationary guide means;

movable guide means telescopically mounted on said intermediate guide means; and

hinge means for hingedly mounting said photoreceptor belt assembly on one end portion of said movable guide means for pivotal movement between an operative position, in which the plane of a portion of said photoreceptor belt onto which the incoming light carrying an optical image of an original to be copied is projected lies at right angles to said incoming light when said belt assembly is held in position within said housing structure, and a released position in which said portion of said photoreceptor belt in angularly displaced from the direction of the telescopic movement of said intermediate and movable guide means when said belt assembly is in position outside said housing structure,

said belt assembly being selectively drawn out of and inserted into said housing structure with said intermediate and movable guide means fully extended and folded relative to said stationary guide means, respectively.

4,009,959
EXPOSURE CONTROL UNIT

Charles J. Watson, Elgin; Larry L. Langrehr, Chicago, and John H. Steiner, Evanston, all of Ill., assignors to Bell & Howell Company, Chicago, Ill.

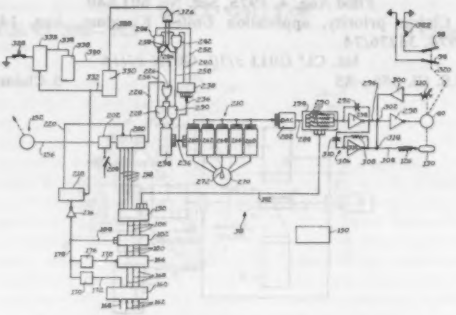
Filed June 26, 1975, Ser. No. 590,472
Int. Cl.² G03B *27/76, 21/36*
U.S. Cl. 355—71 **26 Claims**

1. An exposure control device for a photographic film printer having a light beam for exposure of the film, comprising:

shutter means positioned in the path of said light beam and mounted for movement between a first position wherein the intensity of said light beam is substantially unaffected and a second position wherein the intensity of said light beam is substantially cut off, to thereby vary the intensity of the light beam for exposing the film;

control means for moving the shutter means between said positions; and

programmable means for said control means including



storage means for storing a plurality of preselected operating rates to effect operation of said shutter means to vary the intensity of said light beam in accordance with a predetermined film exposure characteristic.

4,009,960

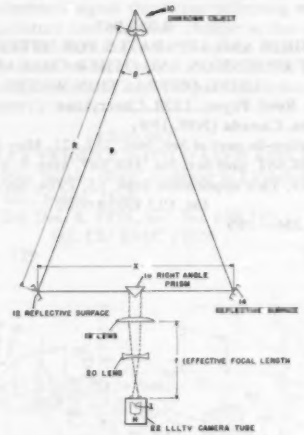
PASSIVE OPTICAL RANGEFINDER

Sidney Feldman, Silver Spring, Md., and George G. Barton, Jr., Harkers Island, N.C., assignors to United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 12, 1975, Ser. No. 549,422

Int. Cl.² G01C *3/00*

U.S. Cl. 356—1 **8 Claims**



1. A passive optical rangefinder for supplying both image and range information in digital form on a remotely located monitor, comprising:

optical means for producing a dual image of an object located at a distance from said rangefinder wherein images of said dual image are spaced by an amount proportional to said distance;

means for transforming said dual image into an electrical signal representative thereof;

control means including means for eliminating all components of said electrical signal but those components representating pairs of parallel features of said dual image having a preferred orientation, means for displaying the pairs of parallel features by scanning a display surface, means for selecting from the display surface a field-of-view containing a pair of said parallel features, and means for producing a control signal varying in proportion to the spacing between said pair of parallel features;

means controlled by said control signal for producing a signal representative of said spacing of said pair of parallel features and said range.

4,009,961

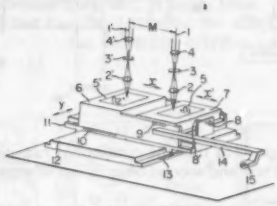
CONTOUR LINE PLOTTING DEVICES

Takashi Maruyama, Kawasaki, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan

Continuation-in-part of Ser. No. 502,949, Sept. 4, 1974, abandoned. This application Mar. 11, 1976, Ser. No. 665,816

Int. Cl.² G01C *11/12*

U.S. Cl. 356—2 **7 Claims**



1. A device for deriving the contour lines of an object from a pair of stereophotographic records of the object, the device comprising:

means for comparing the stereophotographic records to locate the points on the object which have a selected height and for generating first position signals representing the positions of the points;

a correction mechanism rotatably supported about an axis through a point (N) and responsive to the first position signals for generating second position signals which represent corrected positions of the points for defining a contour line corresponding to the selected height, the correction mechanism including means for operating on the first position signals in accordance with the following equation to produce the second position signals:

$$P' = \left(1 - \frac{\Delta H}{H}\right) P,$$

where P is the first position signal and represents the distance between the points and the principal point of the one stereophotographic record, the principal point being the point of intersection of the stereophotographic record with the optical axis of the associated lens through which the record was taken, H represents the distance between the lens and a reference plane of the object when the stereophotographic records were made, ΔH represents the selected height as measured from the reference plane, and P' is the second position signal and represents the distance between the associated points defining the contour line and a reference point; and

indicating means for detecting and indicating the second position signal from said correction mechanism.

4,009,962

EMISSION SPECTROSCOPIC SYSTEM HAVING COMPENSATION FOR BACKGROUND RADIATION

James L. Lauer, Penn Wynne, and Melvin E. Peterkin, Brookhaven, both of Pa., assignors to Sun Oil Company of Pennsylvania, Philadelphia, Pa.

Filed Oct. 3, 1975, Ser. No. 619,270

Int. Cl.² G01J *3/36*

U.S. Cl. 356—82 **18 Claims**

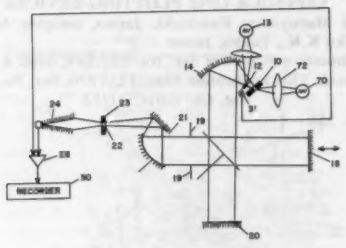
1. A method of detecting discontinuous radiation emitted

from a test object which is radiating both continuous and discontinuous radiation and comprising the following steps:

a. detecting both continuous and discontinuous radiation emitted from the test object;

b. detecting continuous radiation emitted from a second object;

c. balancing the radiation detected from said test and second objects such that the continuous radiation detected from said test and second objects are substantially equal; and



d. subtracting the radiation detected from said second object from the radiation detected from said test object such that the remainder of the detected radiation from said test object is only substantially discontinuous radiation emitted therefrom.

4,009,963

ARRANGEMENT FOR PRODUCING FREE ATOMS OF A SUBSTANCE FOR ATOMIC SPECTROSCOPY PURPOSES

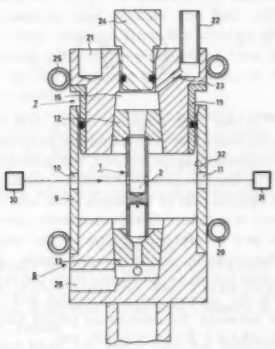
Richard Alexander George, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 19, 1975, Ser. No. 559,824

Claims priority, application Netherlands, Mar. 25, 1974, 7403968

Int. Cl.² G01J *3/30*

U.S. Cl. 356—85 **2 Claims**



1. An apparatus for producing free atoms of a substance for atomic spectroscopy purposes, comprising an oven and an oven element that contains said substance, said apparatus further comprising cooling means adapted to maintain said oven at a temperature level such that there exists therein the situation where

$$\rho_{cT} L t > m,$$

ρ_{cT} is the critical water vapor density,

L is the volume velocity of a carrier gas through said oven,

t is the duration of the drying phase for said oven, and

m is the mass of the water in said oven.

4,009,964

ATOMIC SPECTROSCOPY

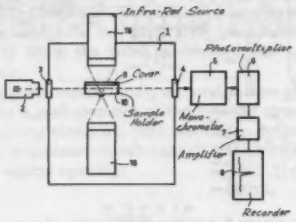
Stephen Archbold Bergen, St. Ives, England, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 4, 1975, Ser. No. 601,640

Claims priority, application United Kingdom, Aug. 14, 1974, 35776/74

Int. Cl.² G01J *3/30;* **G01N** *21/16*

U.S. Cl. 356—85 **5 Claims**



1. Atomic absorption spectroscopic apparatus comprising a chamber adapted to be purged by an inert gas and having windows transparent to a beam of monochromatic light, a source of focused infra-red radiation within said chamber having a focal point adjacent the path of said light beam and means for holding a sample at said focal point.

4,009,965

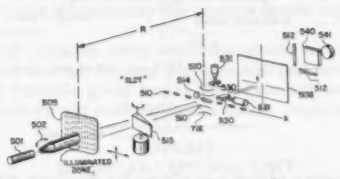
METHOD AND APPARATUS FOR DETERMINING OBJECT DIMENSION AND OTHER CHARACTERISTICS USING DIFFRACTION WAVES

Timothy Reed Pryor, 1578 Cherrylawn Crescent, Windsor, Ontario, Canada (N9E 1P4)

Continuation-in-part of Ser. Nos. 253,421, May 15, 1972, Pat. No. 3,884,581, and Ser. No. 358,547, May 9, 1973, Pat. No. 3,883,249. This application Sept. 13, 1974, Ser. No. 505,777

Int. Cl.² G01B *9/02*

U.S. Cl. 356—109 **21 Claims**



1. A method of determining at least one of the average dimensions of elements within an array of like elements, said method comprising the steps of:

illuminating the boundaries of said elements with electromagnetic radiation to produce diffraction waves,

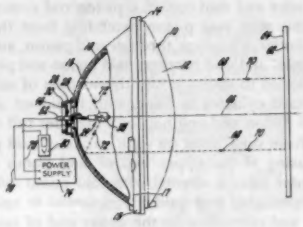
converging, via a lens or lens system, the waves diffracted from said elements to form an interference pattern in a first plane containing the focal point of said lens or lens system, and

analyzing the diffraction pattern formed in a second plane, spaced from said first plane, to determine at least one of the average dimensions of the illuminated elements.

4,009,966
HEADLAMP FOCUSING METHOD

Gale M. Craig, Anderson, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Sept. 24, 1975, Ser. No. 616,384
Int. Cl.² G01J 1/00
U.S. Cl. 356—123 3 Claims

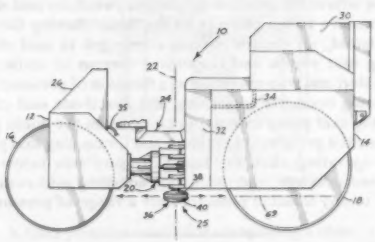


1. A method for aligning a filament light source at a focal point of a reflector to produce parallel light rays from the reflector comprising the steps of preforming a reflector with a filament support opening, supporting a filament support for axial and angular movement with respect to said opening, locating a flat mirror in facing relationship with the light reflecting surface of the reflector with a flat reflecting surface on said mirror being located normal to the optic axis of the reflector to reflect light rays back to the filament to heat the filament, connecting a reference power supply across the terminals of the filament to energize the filament to direct light rays from the reflector for return from the flat mirror back to the light source, adjusting the position of the filament with respect to the reflector, sensing the power supply to produce an electrical signal therefrom reflecting maximum filament temperature and resultant change in the electrical resistance of the filament as produced by the location of the filament on the reflector focal point, and thereafter fixing the filament support at its axially adjusted position in the opening.

4,009,967
ROAD ROLLER VEHICLE WITH WATER APPLICATOR

Claude D. Layton, Salem, Oreg., assignor to Layton Manufacturing Co., Inc., Salem, Oreg.

Filed Dec. 8, 1975, Ser. No. 638,747
Int. Cl.² E01C 19/26
U.S. Cl. 404—129 8 Claims



2. In a ground-traveling vehicle including a frame,

a wheel rotatably mounted on said frame for rotation about a substantially horizontal axis extending transversely of the longitudinal axis of the vehicle adapted to transport the vehicle over the ground, said wheel including a ground-contacting face extending about the perimeter of the wheel, and

a spin-operated water-delivery means mounted on said frame at a location spaced longitudinally along said vehicle from the wheel rotation axis, and intermediate the laterally opposite sides of said wheel,

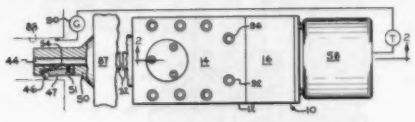
said water-delivery means including a rotatable spray ejecting member rotatable about an upright axis and adapted when rotated and with water supplied thereto to throw such from the periphery of the member as a spray, said member producing a spray pattern impinging on the perimeter of said wheel in a zone substantially paralleling its axis and extending across the face which forms the perimeter of the wheel,

said water-delivery means including means confining the spray pattern to substantially the lateral dimensions of said face.

4,009,968
ELECTRICALLY DRIVEN TOOL COMPENSATOR

John Vandenkieboom, St. Clair Shores, Mich., assignor to LaSalle Machine Tool, Inc., Warren, Mich.

Filed Nov. 28, 1975, Ser. No. 636,114
Int. Cl.² B23B 47/20
U.S. Cl. 408—12 10 Claims

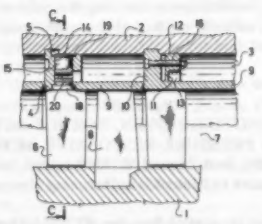


1. In machine tool adjusting apparatus for automatically extending and retracting a machine tool, reversible electric motor means, means interconnecting said tool with said motor means, said interconnecting means being operable to provide for adjusting movements of said tool in response to operation of said motor means, gaging means operable to detect the position of said tool and provide for operation of said motor means, and timer means having a preset time cycle operatively associated with said motor means for terminating motor means operation after operation thereof in response to said gaging means to move said tool through a preset increment of adjusting movement.

4,009,969
SUPPORTING RING FOR STATOR VANES IN AN AXIAL COMPRESSOR

Vaclav Kadera; Jiri Penkava, and Miloslav Vondruska, all of Prague, Czechoslovakia, assignors to CKD Praha, oborovy podnik, Prague, Czechoslovakia

Filed Sept. 26, 1975, Ser. No. 617,192
Claims priority, application Czechoslovakia, Sept. 26, 1974, 6617/74
Int. Cl.² F01D 1/02
U.S. Cl. 415—217 6 Claims



1. A support structure for stator vanes of an axial compressor adapted to be mounted in the stator case of the compressor, comprising in combination,

at least one supporting ring having a plurality of bores located along a row on a circumference of said ring, and at least one first annular recess traversing said plurality of bores in said ring;

a plurality of studs adjustably mounted in said bores and having stator vanes extending therefrom into the flow-through space of the compressor, said first annular recess forming elastic wall means in said supporting ring for clampingly supporting said studs in said supporting ring, said supporting ring having a ring portion and a cylindrical fin portion, said annular recess extending radially inwardly from the radially outer periphery of said ring portion to the radially outer periphery of said cylindrical fin portion, and said ring portion having a second annular recess which extends parallel to the axis of the compressor and having a diameter corresponding substantially to the radial thickness of said cylindrical fin portion.

4,009,970

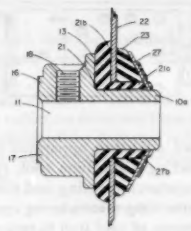
RESILIENT FAN HUB

Claude A. Forth, Jr., 777 Park Drive, Fortville, Ind. 46040

Filed Jan. 15, 1975, Ser. No. 541,155

Int. Cl.² F04D *29/20*

U.S. Cl. 416—134 R **2 Claims**



1. In combination, a hub assembly, a drive shaft, a driven element such as a fan spider having a center disc with a central aperture therein, said hub comprising a body having a central bore therethrough and an integral flange extending radially from the body intermediate its ends, an embossment formed on said body adjacent one face of said flange adapted to accommodate a set screw engaging said driving shaft when received in said central bore, a resilient grommet having a tubular portion through and beyond which said hub body extends and a radially extending portion contiguous with said body flange on one face, said tubular portion extending through said center disc aperture with a face of said disc contiguous with the outer face of said radially extending portion of the grommet, an annular resilient washer received on said tubular portion of the grommet and contiguous with the other face of said disc, and a single annular slide-on fastener received on the portion of the hub body which extends beyond said grommet, said fastener having a plurality of gripping radial legs extending away from said center disc and engaging said hub body, said fastener forming the sole means for compressing said resilient washer and grommet against said fan center disc and said integral body flange.

4,009,971

ELECTRIC MOTOR-DRIVEN, DOUBLE-ACTING PUMP HAVING PRESSURE-RESPONSIVE ACTUATION

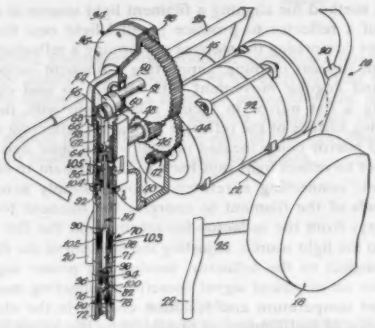
Duane D. Krohn, and Samuel W. Culbertson, both of Arvada, Colo., assignors to Binks Manufacturing Company, Franklin Park, Ill.

Continuation-in-part of Ser. No. 477,216, June 7, 1974, abandoned, which is a continuation of Ser. No. 415,865, Nov. 13, 1973, abandoned, which is a continuation of Ser. No. 184,359, Sept. 28, 1971, abandoned, which is a continuation-in-part of Ser. No. 150,445, June 7, 1971, abandoned. This application Aug. 27, 1974, Ser. No. 500,948

Int. Cl.² F04B *49/00*

U.S. Cl. 417—43 **7 Claims**

1. In a liquid pumping system for an airless spray gun wherein liquid is to be supplied to the gun under substantially uniform pressure in the range of up to **3000** pounds per square inch and the gun is intermittently turned off and on thereby tending to cause fluctuations in the liquid pressure at the gun, a pump and operating mechanism therefor comprising, in combination, a double-acting positive displacement pump having a cylinder with an inlet at its lower end and an outlet adjacent its upper end, a piston reciprocable in said cylinder between said inlet and said outlet, a piston rod connected to and reciprocable with said piston extending from the upper end of said cylinder, a passage through said piston, and check valves in said inlet and said passage, said piston and piston rod being proportioned to displace half the volume of said cylinder whereby said cylinder is filled with liquid on alternate strokes of said piston and one half of a cylinder full of liquid is discharged from said outlet on each stroke of said piston; a crosshead housing at the upper end of said pump cylinder having a cylinder therein aligned with said pump cylinder, a crosshead reciprocably and guidably mounted in said crosshead cylinder and connected to the upper end of said piston rod, and a connecting rod pivotally connected at its lower end



to said crosshead; a high speed electric motor having a drive shaft; a speed-reducing power-multiplying gear train connected to said drive shaft and including an electric clutch; said gear train having an output shaft including an eccentric pivotally connected to the upper end of said connecting rod for positively interconnecting said motor and said piston for reciprocating said piston in said cylinder; said crosshead isolating said pump and said piston and piston rod from the gyratory movement of said eccentric and said connecting rod; an outlet manifold having an inlet connected to said pump outlet and an outlet, an adjustable pressure responsive switch on said manifold responsive to the pressure of the liquid flowing through said manifold, an electric circuit connected to said clutch including said switch and responsive thereto to cause said pump to start and stop operating as a function of pressure, said switch being operative to activate and deactivate said clutch for causing said pump to stop operating when the liquid pressure exceeds a preselected pressure and for causing said pump to start operating when the liquid pressure falls below said preselected pressure, and means for adjusting said switch to respond to any selected pressure over a range of pressures.

4,009,972

TURBOCHARGER LUBRICATION AND EXHAUST SYSTEM

Charles Richard Sarle, Noblesville, Ind., assignor to Wallace-Murray Corporation, New York, N.Y.

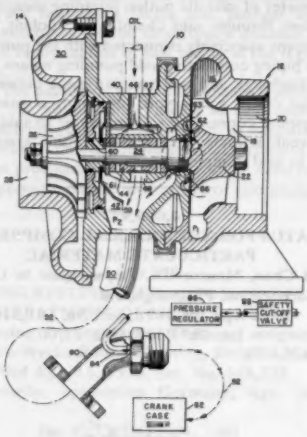
Filed July 10, 1975, Ser. No. 594,646

Int. Cl.² F04B *17/00*

U.S. Cl. 417—407 **4 Claims**

1. A turbocharger including a housing adapted to be driven by exhaust gases from an internal combustion engine, the turbocharger including two spaced impeller wheels mounted

on a common shaft and each rotatable within a respective impeller chamber including each impeller wheel, a lubrication chamber through which said common shaft passes, spaced bearings and seals positioned adjacent said lubrication chamber, an input oil passage leading to and an output passage



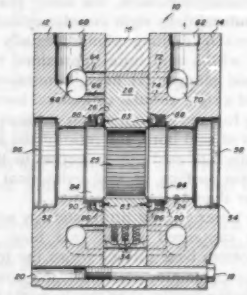
leading from said lubrication chamber, the improvement comprising, one of said spaced seals being in the form of a ring having a through passageway therein, the through passageway establishing fluid communication between said lubrication chamber and the adjacent impeller chamber.

4,009,973

SEAL FOR HYDRAULIC PUMPS AND MOTORS

Allan E. Heinrich, Oconomowoc, Wis., assignor to Applied Power Inc., Milwaukee, Wis.

Filed Aug. 21, 1975, Ser. No. 606,638
Int. Cl.² F01C *19/00*
U.S. Cl. 418—104 **7 Claims**



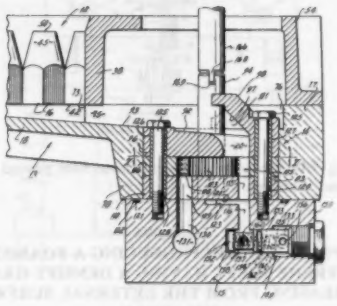
1. A fluid pressure translator comprising a rotor, a cam ring surrounding said rotor and defining a plurality of working chambers therewith, slidable vanes received in radial slots in said rotor and normally biased into abutment with said cam ring, a housing for said rotor defining a rotor chamber having sidewall surfaces facing the side walls of said rotor, a central axially extending bore in said housing and said rotor and adapted to receive a shaft, means for drivingly engaging said rotor with said shaft, and sealing means on each side of said rotor for preventing leakage of fluid from the area between said side wall surfaces and rotor side walls and into said bore, said sealing means each comprising a cylindrical sleeve attached to said rotor and extending axially therefrom in said bore and radially spaced from said housing, and an annular elastomeric sealing member disposed between said sleeve and said housing.

4,009,974

METHOD AND APPARATUS FOR PUMPING VISCOUS MATERIAL

Charles H. Scholl, Vermilion, Ohio, assignor to Nordson Corporation, Amherst, Ohio

Division of Ser. No. 549,189, Feb. 12, 1975, Pat. No. 3,964,645. This application Dec. 15, 1975, Ser. No. 640,555
Int. Cl.² F04C *13/00, 1/14, 15/00*
U.S. Cl. 418—181 **12 Claims**



1. The method of pumping viscous liquid material which comprises,

supplying the liquid material into contact with a rotating shaft to which it adheres upon contact,

shearing said liquid material from contact with the rotating shaft by means of a shear surface located in close proximity to the peripheral surface of said shaft, said shear surface being inclined relative to the peripheral surface of said shaft,

entrapping said liquid material as it is sheared from said shaft within an entrapment chamber, which entrapment chamber communicates with a pump inlet passage, and

causing liquid material as it is sheared from said rotating shaft to force material contained within said entrapment chamber to exit through said pump inlet.

4,009,975

DEVICE FOR PRODUCING AN OBLIQUELY ORIENTED FILM OF THERMOPLASTIC SYNTHETIC RESIN

Tomokazu Ninomiya; Syuzo Sasagawa, both of Iwakuni; Hideo Washio, Odawara, and Nobuhiro Hirata, Ohtake, all of Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

Filed Jan. 2, 1976, Ser. No. 646,015
Claims priority, application Japan, Jan. 6, 1975, 50-33
Int. Cl.² B29C *17/02;* **B29D** *23/04*
U.S. Cl. 425—66 **8 Claims**

1. A device for producing an obliquely oriented film of thermoplastic synthetic resin comprising

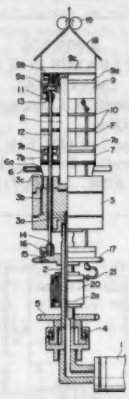
an extruder;

an annular die for forming the resin extruded from the extruder to a tubular film, said annular die being rotated by a power source;

a first mandrel provided at the lower side of the annular die and rotated integral with the annular die;

a second mandrel provided at the lower side of the first mandrel, said second mandrel having an integral gear which is driven by a driving shaft extending through the annular die at the portion thereof where the center of the

die is not located, said driving shaft being driven by a driving system individual to that for the annular die; and



drawing rolls for drawing the resinous film passed over the second mandrel.

4,009,976

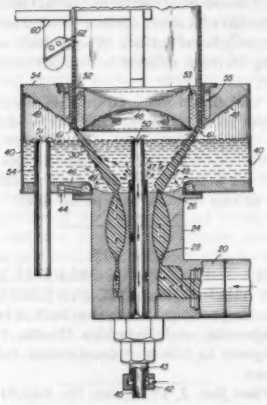
APPARATUS FOR PRODUCING A FOAMED POLYSTYRENE SHEET HAVING A DENSITY GRADIENT DECREASING FROM THE EXTERNAL SURFACES INWARDLY

David Emil Johnson, Macedon, N.Y., assignor to Mobil Oil Corporation, New York, N.Y.

Division of Ser. No. 394,039, Sept. 4, 1973, Pat. No. 3,864,444. This application Nov. 21, 1974, Ser. No. 526,015

Int. Cl.² B29D *23/04*

U.S. Cl. 425—68 **2 Claims**



1. In combination with an apparatus comprising a die having an inlet and an outlet, said outlet being annular and being further characterized as positioned at the top of said die thereby allowing a hot cylindrical thermoplastic to be extruded upwardly through said die outlet; and an annular calender ring located above said die, said calender ring having the same centerline as said annular die outlet, said calender ring having an inside diameter larger than the outlet outside diameter of said die, thereby allowing an extrudate from said die to be biaxially stretched as said extrudate is drawn from said die and through said calender ring, the improvement which comprises: A chamber located between and immediately adjacent to said die and said calender ring; a stationary first hollow duct extended upward through said die and inside said inner diameter of said annular die outlet into said chamber; a vertically moveable second hollow duct positioned within said first duct and thereby creating an annular space between said first duct and said second duct; a vertically moveable third hollow duct extended upward into said chamber and being located outside the outer diameter of said annular die outlet; a cooling fluid discharge located at the base of said chamber and outside said outer diameter of said die outlet; pumping means to circulate said coolant through said chamber; a coolant temperature control means associably connected with the pumping means; discharge piping connecting said pumping means to said cooling fluid discharge and said annular space between said first and second ducts; a reservoir containing a quantity of said coolant; piping connecting said reservoir to said second and third moveable ducts; and suction piping connecting said reservoir to said pumping means.

4,009,977

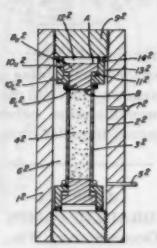
APPARATUS FOR THE TRIAXIAL COMPRESSION OF PARTICULATE MATERIAL

Hung-Chi Chao, Monroeville, Pa., assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed Apr. 29, 1976, Ser. No. 681,310

Int. Cl.² B30B *5/02, 11/00*

U.S. Cl. 425—78 **5 Claims**



1. A triaxial compression apparatus for the compaction of particulate material feed, said apparatus comprising,

a non-deformable enclosure, the inner portion of which defines a substantially right circular cylindrical bore,

a non-deformable floating plunger axially disposed and supported within said bore approximal the upper end thereof, said plunger (i) being comprised of an upper section and a right circular cylindrical lower section, and (ii) having top and bottom planar surfaces perpendicular to the axis of said bore, the ratio of the area of the top planar surface of said upper section to the area of the bottom base surface of said cylindrical lower section being other than 1,

said plunger lower section fitting slidably within a deformable tube supported within said bore, whereby said plunger bottom base surface forms the top surface of a confine for containing said feed, the outer diameter of said tube being smaller than the diameter of said bore, so that the annular region between the outer surface of said tube and the surface of said bore forms a chamber for containing media under pressure,

said plunger being supported within a member having upper and lower sleeve portions, in which (i) the perimetric surface of the plunger upper section and the inner surface of the upper sleeve portion mate, and (ii) the perimetric surface of the plunger lower section and the inner surface of the lower sleeve portion, mate in fluid tight engagement to provide a cavity bound by said perimetric surfaces and sleeve portions, which cavity is isolated from said chamber,

a non-deformable means sealing the lower end of said bore, said lower end seal means including a substantially right circular cylindrical element, the top base diameter of

which is approximately equal to the inner diameter of said tube, said cylindrical element being fitted within said tube so that the top base surface of said element forms the bottom enclosure of said feed confine,

a non-deformable capping means sealing the upper end of said bore, said capping means having a substantially planar surface oppositely facing said plunger top planar surface and being spaced therefrom a distance sufficient to permit ready ingress of said media in the region therebetween,

means for the admission of media to said chamber, and

means for the admission of media to said therebetween region, whereby upon pressurization, an isostatic pressure will be exerted on the circumferential surface of said tube while the pressurization of said therebetween region will exert a pressure on the top surface of said plunger upper section.

4,009,978

MOLDING SYSTEM WITH AUTOMATIC FLUID TREATMENT OF MOLD CAVITY

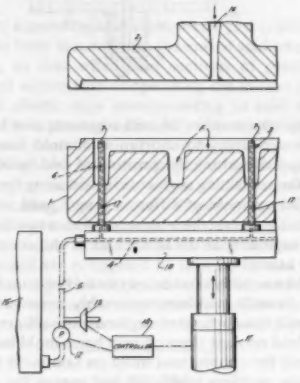
Michael Hanning, Oerlinghausen, Germany, assignor to Hanning-Elektro-Werke Robert Hanning, Bielefeld, Germany

Filed Apr. 16, 1975, Ser. No. 568,735

Claims priority, application Germany, Apr. 18, 1974, 2418658

Int. Cl.² B29C *1/04, 7/00*

U.S. Cl. 425—98 **4 Claims**



1. A molding apparatus comprising:

a first mold half;

a second mold half forming with said first half a mold cavity and formed with a bore between said cavity and the exterior;

means operatively connected to said first mold half for moving same toward and away from said second mold half to open and close said cavity;

an elongated ejector element in said bore having an inner end displaceable into said cavity and an outer end lying outside said mold halves, said element being formed with a passage extending between said ends;

means operatively connected to said element and shiftable relative to said second mold half for displacing said element between a first position with said inner end within said cavity to eject a molded article from said cavity and a second position with said inner end generally flush with an inner surface of said cavity; and

means including a source of mold-wall treating release liquid connected to said passage at said outer end for injecting a portion of said liquid into said cavity in said first position of said element, said ejector element being formed with means for training a spray of the liquid from said passage upon a wall of said cavity.

4,009,979

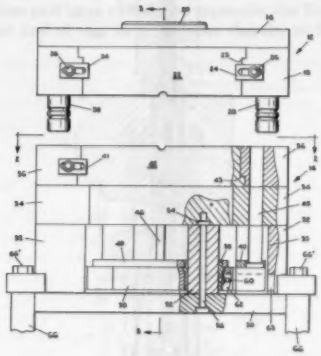
MOLDING DIE APPARATUS

Roger G. Martin, Greenville, Mich., assignor to Master Unit Die Products, Inc., Greenville, Mich.

Filed June 26, 1974, Ser. No. 483,238

Int. Cl.² B29F *1/14*

U.S. Cl. 425—107 **9 Claims**



1. In a die frame assembly for molding parts from heated fluid material, said die frame assembly comprising:

a first frame including a first mold half;

a second frame including a second mold half, said second frame including a clamp plate through which said frame is secured to a molding machine and a support plate spaced from said clamp plate;

at least one of said first and second mold halves having a mold cavity forming a part to be molded;

at least one of said first and second mold halves having means passing the fluid molding material from a sprue opening to the mold cavity;

at least one support post extending between the clamp plate and the support plate to provide rigid support for the support plate;

an ejector plate mounted within the second frame with the support post extending through the ejector plate;

ejector pins mounted on the ejector plate and extending through the second mold half;

means mounting the ejector plate for reciprocatory movement within the second frame between a retracted position and an ejected position, the ejector pins being positioned at the surface of the mold cavity or the fluid material passing means when the ejector plate is in a retracted position, the ejector pins extending into the mold cavity or the fluid material passing means when the ejector plate is in the ejected position to eject the molded part from the second die half as the mold separates;

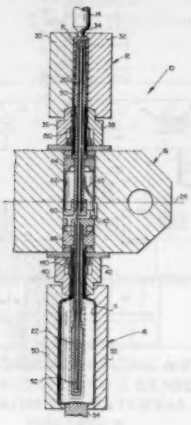
the improvement which comprises:

a bushing mounted to said ejector plate and snugly engaging said at least one support post to permit smooth guided movement of the ejector plate within the second die frame during ejection of the molded parts and return of the ejector plate to the retracted position, said ejector plate riding on and being guided within the second frame essentially only by said at least one support post.

4,009,980
INJECTION BLOW MOLDING MACHINE HAVING MOVABLE PARISON PINS

Donald F. Armour, Bloomfield, Conn., and William B. Niemi, East Longmeadow, Mass., assignors to Package Machinery Company, East Longmeadow, Mass.

Filed July 23, 1975, Ser. No. 598,330
Int. Cl.² B29C 17/07
U.S. Cl. 425—242 B 8 Claims



1. In an injection blow molding machine having an injection nozzle cooperating with a parison mold to inject a quantity of settable material into the mold cavity to form a parison and a blow mold having a cavity in which the parison is received from the parison mold and which blow mold cavity defines the shape of an article formed from the parison in a blowing operation, the improvement comprising:

a parison arm movable in relation to the parison and blow molds;

a parison pin mounted on the parison arm for movement relative to the arm along and about the longitudinal pin axis and movable with the arm relative to the cavities of the parison and blow molds, the parison being formed over the parison pin in the cavity of the parison mold;

separable neckring segments forming a neckring mounted on the arm about the parison pin and engaging an end portion of the parison formed on the pin and operable to hold said end portion in a fixed position relative to said arm during movement of the parison with the pin and arm from the parison mold to the blow mold; and

actuating means mounted on the parison arm and connected with the parison pin and operable to move the pin along and about the longitudinal pin axis relative to the parison arm for axially stretching and twisting the portion of the parison extending beyond the neckring segments during movement of the parison with the pin and arm from the parison mold to the blow mold.

4,009,981
UNIVERSAL MOLD TOOLING SYSTEM FOR THERMOFORMING MOLDS

Stanley R. Rosen, 8 Gerardine Place, Spring Valley, N.Y. 10977

Filed Nov. 10, 1975, Ser. No. 630,154
Int. Cl.² B29C 17/00
U.S. Cl. 425—388 3 Claims

1. Thermoforming apparatus adapted to accommodate molds of different lengths to form molded parts in a horizontal web, comprising:

a vertically movable support;

a mold base assembly, comprising:

a flat-topped rectangular basic mold base secured horizontally to said support,

a plurality of flat-topped straight mold base extension segments,

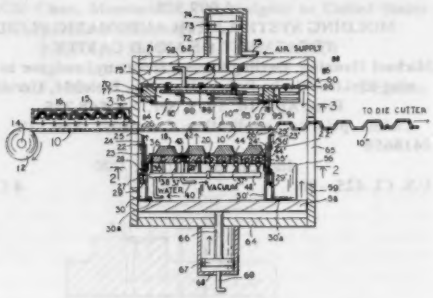
means for removably securing said segments together in side-by-side position to form a rectangular array of predetermined length, and

means for removably securing one end of said array to one end of said basic mold base to define therewith a flat-topped horizontal platform for supporting a mold of desired length;

a first vertically movable straight gate secured to the other end of said basic mold base and disposed to engage said web transversely;

a second vertically movable straight gate;

means removably securing said second gate to a front one of said segments at the other end of said array to engage said web transversely a predetermined distance from said first gate,



whereby any number of said segments can be removed from said array to shorten said mold base assembly without disturbing the position of said basic mold base and the remaining segments in said array for supporting a different mold of different length, and whereby said second gate can then be secured to a remaining one of said segments at the other end of the shortened mold base assembly;

a manifold assembly connected to said basic mold base, and having branch members removably connected to all of said mold base extension segments in said array for passing a fluid coolant through said basic mold base and said segments for cooling said mold on said mold base assembly while molding said web; and means for quickly detaching said branch members from those of said segments to be removed for quickly adjusting said manifold assembly in length corresponding to the length of the shortened mold base assembly.

4,009,982
MECHANISM FOR FORMING AN ENLARGED COUPLING ON THE ENDS OF PLASTIC PIPE

Johann H. Maier, Miami Beach, Fla., assignor to Universal Plastic Pipe Bending Corporation, Miami, Fla.

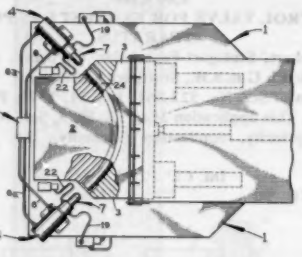
Filed Feb. 11, 1974, Ser. No. 441,161
Int. Cl.² B29C 17/02
U.S. Cl. 425—389 7 Claims

1. An apparatus for uniformly expanding the ends of sections of pre-formed and pre-heated plastic pipe which comprises;

cooperating die means for retaining said sections of pre-heated plastic pipe, said die means including an open central portion having a cross-sectional diameter corresponding with the outer diameter of said sections of pre-heated plastic pipe, so that said sections of pre-heated plastic pipe may be securely retained within said cooperating die means;

at least one mandrel adapted for axial reciprocation into the

end of said cooperating die means, so that said mandrel, upon the insertion into the end of said cooperating die means, corresponds to only a portion of said section of said plastic pipe retained therein, said mandrel including an outer cylindrical sleeve forming the portion of said mandrel insertable into said cooperating die means, and conforming in configuration to the inner surface of said sections of plastic pipe, and said mandrel further including an expandable elastomeric jacket disposed substantially over the entire surface of said outer cylindrical sleeve, said mandrel having an outside diameter comprising said expandable elastomeric jacket which is less than the inside diameter of said sections of plastic pipe, so that said mandrel may be inserted into said sections of plastic pipe retained within said cooperating die means without deforming said sections of said plastic pipe; and



means for expanding said elastomeric jacket after said mandrel has been inserted into the end of said cooperating die means, so that when said sections of plastic pipe are retained within said cooperating die means the portions of said plastic pipe corresponding to said mandrel are uniformly expanded outwardly into conformity with the cross-sectional diameter of said die means, said means for expanding said elastomeric jacket including means for injecting pressurized air within said mandrel, said mandrel including a bore axially disposed therein, and a plurality of apertures through said outer cylindrical sleeve communicating with said axial bore so that when said pressurized air is applied to said bore, said expandable elastomeric jacket disposed over said outer cylindrical sleeve is expanded substantially uniformly outwardly against said sections of preheated plastic pipe.

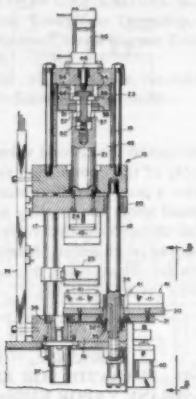
4,009,983

HYDRAULIC MOLD CLAMPING MECHANISM FOR INJECTION MOLDING MACHINE

Arthur William Jacobs, 5994 Columbia Road, North Olmsted, Ohio 44070

Filed Jan. 16, 1976, Ser. No. 649,592
Int. Cl.² B29F *1/06*
U.S. Cl. 425—451.2 **12 Claims**

1. A hydraulic mold actuating mechanism for an injection molding machine of the type having an injection assembly operative to inject plasticized material into a cavity defined between a pair of mating mold sections of which one is movable into and out of mating engagement with the other, said mold actuating mechanism being operative to move said one mold section as aforesaid and to clamp said one mold section against the other mold section to resist separation of said mold sections upon injection of plasticized material under pressure into said cavity, said mechanism comprising coaxial tandem relatively small and large piston-cylinder assemblies of which the piston rod of the latter is connected to said one mold section and of which the piston rod of the former is connected to said large piston whereby actuation of said small piston-cylinder assembly in opposite directions imparts movement of said one mold section into and out of mating engagement with said other mold section; said large piston having a passage communicating the rod and head ends of said large cylinder with each other; a makeup fluid tank having fluid communication with the rod end of said large cylinder and having a capacity at least equal to the displacement of the piston rod of said large piston whereby, during movement of said large piston in opposite directions, fluid is conducted through said passage from said rod end and makeup fluid tank into said head end and vice versa according to the direction of movement of said large piston; a fluid pressure actuated valve in said large piston operative when actuated by fluid under pressure to close said passage when said mold sections are in mating engagement; said large cylinder having an inlet port to conduct fluid under pressure into said large piston to actuate said valve as aforesaid and into said large cylinder to pressurize the fluid trapped in the heat end of said large cylinder thereby to firmly hold



said mold sections in mating engagement during injection of plasticized material into said cavity; said inlet port comprising an axially extending outer tubular member which is secured to said cylinder head to extend parallel to and alongside the cylinder of said small piston-cylinder assembly and into which fluid under pressure is conducted from its axially outer end, an axially extending inner tubular member which is secured to said large piston to extend into said outer tubular member in all positions of said large piston, said inner tubular member defining with said cylinder head an orifice through which fluid under pressure in said outer tubular member is conducted into said head end and providing a passageway through which fluid under pressure in said tubular member upstream of said orifice is conducted into said large piston to actuate said valve as aforementioned.

4,009,984

VAPOR INJECTION SYSTEM FOR FUEL COMBUSTION

Charles F. Morrison, 25 Pearl St., Malden, Mass. 02148

Filed Mar. 8, 1976, Ser. No. 664,967
Int. Cl.² F23J *7/00*
U.S. Cl. 431—4 **10 Claims**

1. An apparatus for adding water vapor to a fossil fuel combustion system, which system has an air intake assembly for introducing a flow of air into the combustion area of the combustion system, which comprises:

a. a housing having a reservoir of water disposed therein;

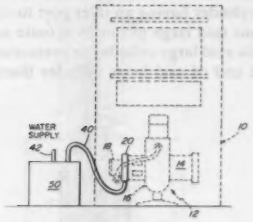
b. a platform disposed in the housing and in vacuum-sealing floating engagement with the reservoir, the platform including:

i. a depending sleeve-like member fixedly secured to the platform and extending into the reservoir, the inner surface of the member and the upper surface of the reservoir defining a vapor chamber;

ii. a depending tube-like member fixedly secured to the platform and extending through the vapor chamber and into the reservoir;

c. first valve means to seal the tube-like member, said valve means in communication with the ambient environment, which valve means opens when there is a pressure differential between the vapor chamber and the ambient environment;

d. second valve means to seal the vapor chamber from the ambient environment, said valve means adapted to open when there is a pressure differential between the vapor chamber and the ambient environment;



e. a conduit secured to the second valve means and the air intake assembly of the combustion system; and

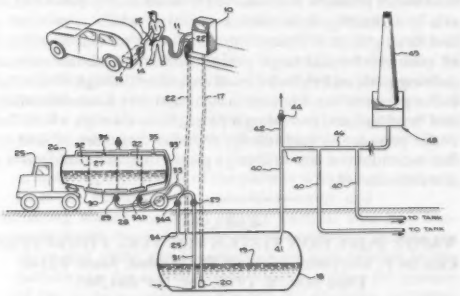
f. means to create a pressure differential between the ambient environment about the housing and the vapor chamber to draw air through the first valve, through the water, and into the vapor chamber, forming a saturated air stream, which air stream flows through the second valve and into the air intake assembly.

4,009,985

METHOD AND APPARATUS FOR ABATEMENT OF GASOLINE VAPOR EMISSIONS

John H. Hirt, Monterey Park, Calif., assignor to Hirt Combustion Engineers, Montebello, Calif.

Filed Aug. 8, 1975, Ser. No. 603,002
Int. Cl.² F23G 7/06
U.S. Cl. 431—5 **19 Claims**



1. In a method of abating emissions of gasoline vapors at a gasoline service station at which liquid gasoline is transferred between a storage tank and a supply tank by flowing through a liquid gas line means having vapor tight sealed connections with said tanks; the steps of:

providing gasoline vapor line means between said tanks for communication between vapor space above liquid levels in said tanks;

providing a gas vapor vent line from vapor space in said storage tank to a burner means;

passing gasoline vapors from said supply tank into and through said vapor space in said storage tank;

sensing vapor pressure at said vent line means;

causing gasoline vapors in said vent line means to be directed to the burner means when a preselected vapor pressure is sensed;

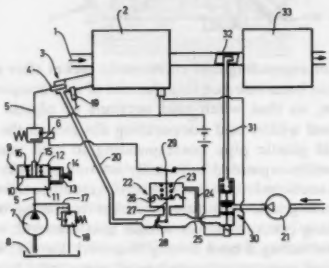
and igniting and burning said gasoline vapors at said burner means.

4,009,986

AIR CONTROL VALVE FOR EXHAUST GAS PURIFYING APPARATUS

Konrad Eckert, Stuttgart-Feuerbach, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

Division of Ser. No. 322,861, Jan. 11, 1973, Pat. No. 3,945,802. This application May 12, 1975, Ser. No. 576,265
Claims priority, application Germany, Jan. 14, 1972, 2201739
Int. Cl.² F23H 1/02
U.S. Cl. 431—90 **4 Claims**



1. In combination, a heating burner for heating a reactor of an exhaust gas purifying apparatus to operating temperatures, fuel supply means for delivering burner fuel to said heating burner, said fuel supply means including a fuel conduit, air supply means for delivering combustion air to said heating burner, said air supply means including a burner air conduit and an air pump disposed in the latter, and an air control valve, the air control valve including:

a. a movable valve member situated in said burner air conduit downstream of said air pump; and

b. regulating means coupling to said movable valve member for regulating the air quantities delivered to said heating burner to a constant value independently from the counterpressure at said heating burner and independently from the output delivery of said air pump, said regulating means including:

i. venturi nozzle disposed in said burner air conduit upstream of said movable valve member, said venturi nozzle having a narrowest flow passage section;

ii. a diaphragm having first and second sides;

iii. linkage means connecting said diaphragm with said movable valve member;

iv. means for communicating the pressure prevailing in said narrowest flow passage section with said first side of said diaphragm;

v. a spring means in engagement with said first side of said diaphragm; and

vi. means for communicating the pressure prevailing in said burner air conduit downstream of said venturi nozzle and upstream of said movable valve member with said second side of said diaphragm.

4,009,987
ELECTRIC LAMP HAVING AN INTERNAL SWITCHING MECHANISM

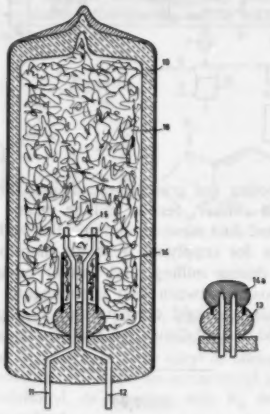
Anton Boekkooi; Adrianus Antonius Hurx, and Johannes Maria Josephus van Lieshout, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 463,729, April 24, 1974, abandoned. This application Oct. 10, 1975, Ser. No. 621,483

Claims priority, application Netherlands, May 1, 1973, 7306018

Int. Cl.² F21K *5/02*

U.S. Cl. 431—95 R **4 Claims**



1. A combustion flash lamp, having two lead-in conductors extending to the interior of the lamp envelope, at least one of the conductors being connected in a place inside the lamp envelope to means for igniting said conductors being completely surrounded over at least an axial part thereof by a common sleeve member of an electrically conducting material, said member including means for deforming to electrically connect said conductors responsive to heat resulting from the ignition of said lamp, said means including a material having a softening temperature lower than the normal temperature in said flash lamp during ignition, said softening temperature being the temperature at which said member will bend without the imposition of external forces, said member having a sleeve contour and disposed in axially spaced relation from said heat source, said sleeve having a fixed relationship relative to said conductors prior to firing, and disposed in spaced relationship to at least one of the conductors prior to firing.

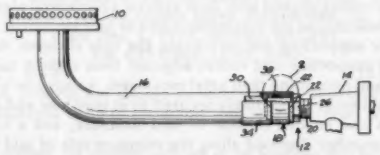
4,009,988
GAS VALVE AND MIXING TUBE ASSEMBLY FOR GAS BURNER

Donald E. Duperow, and Norbert Hughes, both of Detroit, Mich., assignors to Lincoln Brass Works, Inc., Detroit, Mich.

Filed Dec. 29, 1975, Ser. No. 644,896

Int. Cl.² F23D *11/00*

U.S. Cl. 431—114 **21 Claims**



1. In an assembly of a valve and a mixing tube for a burner, the valve having a metal body which includes an outlet hood for fuel gas, the mixing tube being formed of metal and having an upstream end portion into which the hood is inserted, improved structure which comprises,

plastic bushing means having an inner surface portion frictionally fitted against the exterior of said hood,

said bushing means having an outer surface portion frictionally fitted against the interior of said upstream end portion of said mixing tube,

said bushing means forming a retainer which frictionally retains said hood and tube in assembled relation and forming a spacer which maintains the adjacent metal surfaces of said hood and tube out of contact with each other.

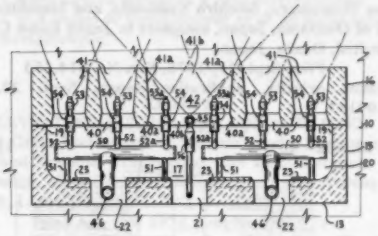
4,009,989
COMBINATION GAS AND OIL BURNERS

Gordon M. Bitterlich, Tredyffrin Township, Chester County, Pa., assignor to National Airoil Burner Company, Inc., Philadelphia, Pa.

Filed Mar. 11, 1976, Ser. No. 665,888

Int. Cl.² F23C *5/20*

U.S. Cl. 431—178 **11 Claims**



1. Combustion apparatus for heating an exposed inner face of an upwardly extending wall of a furnace comprising

support means associated with said wall having an opening communicating with the exterior of said wall,

register members or controlling the introduction of air into said opening,

said support means having a burner block portion with a plurality of spaced air delivery openings directed upwardly along said wall,

certain of said openings being frustoconical and flaring towards their outlets,

one of said openings being elongated and flaring toward its outlet,

an oil burner assembly having an oil burner nozzle disposed within said elongated opening for delivery of atomized oil for combustion upwardly within said elongated opening, and

a plurality of gas burners each disposed within one of said openings.

4,009,990
METHOD FOR IMPROVING THE INCORPORATION OF RADIOACTIVE WASTES INTO A VITREOUS MASS

Roger Bonniaud, Goudargues; Antoine Jouan, Bagnols-sur-Ceze, and Claude Sombret, Courthezon, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Feb. 27, 1975, Ser. No. 554,231

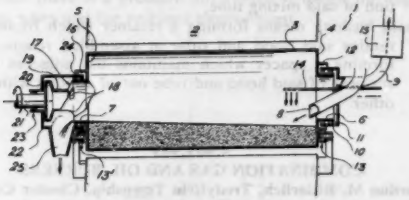
Claims priority, application France, Feb. 28, 1974, 74.06887

Int. Cl.² F27B *14/00, 15/00*

U.S. Cl. 432—13 **3 Claims**

1. In a process for incorporating radioactive waste into glass by melting glass and the waste together in a smelting furnace to form a vitrified mass, the improvement consisting of pretreating the glass and waste to form a calcinated feed for the smelting furnace by:

simultaneously and continuously feeding the radioactive waste in liquid form and particulate glass into the inlet of a rotating cylinder inclined with respect to the horizontal to form a moving bed of a mixture of particulate glass and radioactive waste; and



heating said mixture within the rotating cylinder to produce a calcinate, suitable for feeding the smelting furnace, in the form of a coating on the glass particles.

4,009,991

PROCESS FOR PRODUCING CARBON FIBERS

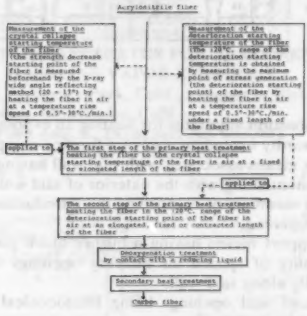
Yasuo Matsumura; Soichiro Kishimoto, and Masahiko Ozaki, all of Okayama, Japan, assignors to Japan Exlan Company Limited, Osaka, Japan

Filed Sept. 17, 1975, Ser. No. 614,153

Claims priority, application Japan, Sept. 20, 1974, 49-109163

Int. Cl.² F27B *9/04*

U.S. Cl. 432—23 **11 Claims**


Acrylonitrile fiber
Measurement of the crystal collapse starting temperature of the fiber
The strength decrease starting point of the fiber is measured beforehand by the X-ray wide angle reflecting method (20 = 17°) by heating the fiber in air at a temperature rise speed of 0.5°-30°C./min.)
Measurement of the deterioration starting temperature of the fiber
(The 120°C. range of the deterioration starting temperature is obtained by measuring the maximum point of stress generation (the deterioration starting point) of the fiber by heating the fiber in air at a temperature rise speed of 0.5°-30°C./min. under a fixed length of the fiber)
applied to
The first step of the primary heat treatment heating the fiber to the crystal collapse starting temperature of the fiber in air at a fixed or elongated length of the fiber
applied to
The second step of the primary heat treatment heating the fiber in the 120°C. range of the deterioration starting point of the fiber in air at an elongated, fixed or contracted length of the fiber
Deterioration treatment by contact with a reducing liquid
Secondary heat treatment
Carbon fiber

1. A process for producing carbon fibers which comprises continuously heat-treating acrylonitrile fibers up to the crystal collapse starting temperature of said fibers while maintaining said fibers under a fixed length or tension in an oxidizing atmosphere, then sufficiently thermally stabilizing said fibers by further subsequently continuously heat-treating them in a temperature range gradually elevated up to a fixed temperature in a range from a temperature about 20° C. lower than the deterioration starting temperature of said fibers to a temperature about 20° C. higher than said deterioration starting temperature in an oxidizing atmosphere, treating the thus obtained thermally stabilized fibers with a reducing liquid and subsequently carbonizing or graphitizing said fibers in a non-oxidizing atmosphere or under a vacuum.

4,009,992

INSTALLATION AND METHOD FOR MANUFACTURING CEMENT

Gerd Eicke, Kaarst, Germany, assignor to Loesche Hartzerkleinerungs -und Zementmachinen KG, Dusseldorf, Germany

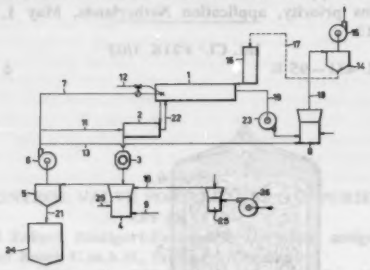
Filed Nov. 20, 1974, Ser. No. 525,634

Claims priority, application Germany, Dec. 7, 1973, 2361060

Int. Cl.² F27B *7/20, 7/38*

U.S. Cl. 432—106 **5 Claims**

1. In an installation for producing cement including first milling means for grinding a mixture of limestone and clay minerals to raw flour, means for calcining and firing said raw flour in a rotary kiln to form clinker, means for cooling said clinker, means for grinding said clinker to cement flour and means for storing said cement flour, the improvement comprising means downstream of said rotary kiln for substantially simultaneously cooling and grinding said clinker to cement



flour, said cooling and grinding means including means for receiving said clinker, second milling means for grinding said clinker, and duct means communicating with said second milling means for supplying fresh air thereto for cooling said clinker during milling, and further comprising filter means interposed between said simultaneous cooling and grinding means and said cement flour storage means for separating said cement flour from said cooling air.

4,009,993

AUTOMATIC PLANT FOR THE DRIVING AND FAST SINGLE-PHASE FIRING OF CERAMIC TILES

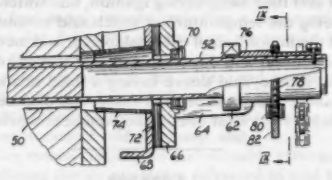
Pietro Marazzi, V.le Giacobazzi 3, Sasuolo (Modena), Italy, 41049

Filed June 20, 1975 Ser. No. 588,812

Claims priority, application Italy, July 2, 1974, 24711/74

Int. Cl. F 27B 9/14; F 27D *3/00*

U.S. Cl. 432—122 **11 Claims**



1. An apparatus for firing ceramic tiles by continuously progressively advancing the tiles coated on their upper face with a glaze composition along a horizontal transfer plane through an elongated treatment chamber, comprising an elongated thermally insulated tunnel-like structure defining said treatment chamber having a side wall on each side, a succession of rollers aligned with their axes on a horizontal plane and perpendicular to the longitudinal axis of said treatment chamber for supporting and advancing the tiles thereon, support means supporting said rollers adjacent their ends in said side walls and permitting their axial movement, an annular toothed driven member detachably secured to at least one end of said rollers and located outside of said structure, and a toothed drive member disposed along the common side of said rollers and engaged with said tooth driven member to rotate said rollers, said driven member being individually disengageable from said rollers to allow each roller to be individually removed or introduced by motion parallel to its axis.

4,009,994
PROCESS AND PRODUCT OF OPTICAL BRIGHTENING WITH QUATERNIZED BENZOFURANYL-BENZIMIDAZOLES

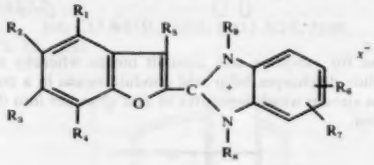
Hans Schlaepfer, Basel, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 499,687, Aug. 22, 1974, Pat. No. 3,940,417, which is a continuation of Ser. No. 205,303, Dec. 6, 1971, abandoned. This application Oct. 2, 1975, Ser. No. 618,869

Int. Cl.² D06P *1/38*; **C07D** *235/12*; **D06P** *3/70*

U.S. Cl. 8—1 W **6 Claims**

1. A process for the optical brightening of organic materials, comprising the step of homogeneously distributing in the material or uniformly distributing on the material an optical brightener of the formula



wherein

R_1 denotes hydrogen or a lower alkyl group or together with R_2 denotes a fused benzene radical,

R_2 denotes hydrogen, a lower alkyl or alkoxy group, chlorine, bromine, carboxyl, aminocarbonyl sulphonic acid, aminosulphonyl, or together with R_3 denotes a fused benzene radical,

R_3 denotes hydrogen, lower alkyl, alkoxy or together with R_4 denotes a fused benzene radical,

R_4 denotes hydrogen, a lower alkyl group, chlorine or bromine,

R_5 denotes hydrogen, a lower alkyl group or phenyl,

R_6 denotes hydrogen, lower alkyl, lower alkoxy, chlorine, bromine, phenyl or alkylsulphonyl with one to four carbon atoms,

R_7 is hydrogen,

R_8 denotes a lower alkyl group, a hydroxy-lower-alkyl group, cyanoethyl, phenyl which is unsubstituted or substituted by a chlorine, bromine, a lower alkyl or lower alkoxy group, or phenyl loweralkyl,

R_9 denotes a lower alkyl group, a hydroxy-lower-alkyl group, phenyl lower-alkyl which is unsubstituted or substituted by chlorine or lower alkoxy, or the $-CH_2CN$, $-CH_2CONH_2$ or $-CH_2COOR$ radical, wherein R represents alkyl with one to four carbon atoms, and

X denotes halogen, lower alkylsulphonic acid or substituted by lower alkyl.

4,009,995
PROCESS FOR DYEING MOLDED ARTICLES CONTAINING UREA FORMALDEHYDE RESIN OR MELAMINE FORMALDEHYDE RESIN

Hans Dressler, 1236 Catalina Drive, Monroeville, Pa. 15146

Filed Dec. 5, 1975, Ser. No. 637,891

Int. Cl.² D06P *1/382*, *3/02*

U.S. Cl. 8—4 **13 Claims**

1. A process for dyeing molded articles containing urea formaldehyde resin or melamine formaldehyde resin comprising:

a. treating the molded articles in an aqueous dye bath containing one or more dyes selected from the group consisting of dichlorotriazinyl dyes or premetallized dyes at a temperature in the range of 50° to 100° C.

4,009,996
REACTION PRODUCTS OF PHENOLSULPHONIC ACID-UREA-FORMALDEHYDE AS TANNING AGENTS AND PROCESS FOR THEIR MANUFACTURE

Albert Würmli, Riehen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Nov. 5, 1974, Ser. No. 520,995

Claims priority, application Switzerland, Nov. 8, 1973, 15715/73

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² C08G *75/20*, *75/24*; **C14C** *3/20*

U.S. Cl. 8—94.24 **13 Claims**

1. Reaction product of phenolsulphonic acid-urea-formaldehyde from

A 100 parts by weight of a condensation product from

a. 1 mole of a hydroxyphenylsulphone-hydroxyphenylmonosulphonic acid having 1 to 4 hydroxyphenylsulphone groups per molecule, and

b. 0.1 to 0.6 mole of an alkoxybenzene having 1 to 4 carbon atoms in the alkoxy radical, and

B 10 to 40 parts by weight of a reaction product or of a mixture of

c. 1 mole of urea and/or of a urea derivative and

d. 1 to 4 moles of formaldehyde or of an agent releasing formaldehyde.

4,009,997
LEVELLING AUXILIARIES FOR ACID DYES

Norbert Greif, Ludwigshafen; Michele Vescia, Limburgerhof; Manfred Daeuble, Frankenthal, and Hans Heinrich, Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Aug. 15, 1974, Ser. No. 497,571

Claims priority, application Germany, Aug. 29, 1973, 2343418

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² D06P *1/649*, *5/06*

U.S. Cl. 8—169 **6 Claims**

1. In a process for dyeing a fibrous material consisting essentially of polyamide fibers with an acid dye in an acid pH range, the inprovement which comprises: carrying out the dyeing in the presence of a levelling auxiliary mixture which, based on the solids in each case, contains:

a. from 30 to 90% by weight of a surfactant containing one or more sulfonic acid groups in salt form; and

b. from 10 to 70% by weight of an oxyethylated synthetic linear polyamide which has been prepared by the reaction of 1 part by weight of polyamide with from 2.5 to 3.5 parts by weight of ethylene oxide.

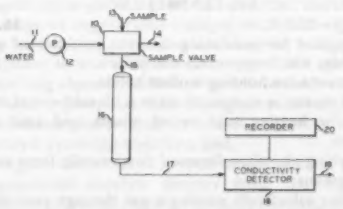
4,009,998
ACID CONCENTRATION MEASUREMENT

L. V. Benningfield, Jr., Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Sept. 5, 1975, Ser. No. 610,800

Int. Cl.² G01N *27/06*

U.S. Cl. 23—230 R **6 Claims**



1. The method of measuring the concentration of hydroflu-

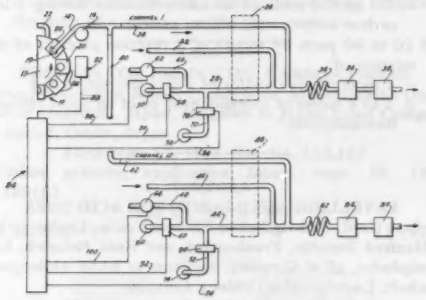
oric acid in a test material which contains hydrofluoric acid, acid-soluble oils and light paraffins, which method comprises passing through a mixing device at a predetermined rate a first stream of water containing a water-miscible solvent capable of dissolving the hydrocarbons present in the test material, introducing a predetermined volume of said test material into said first stream upstream from said mixing device, and measuring the electrical conductivity of the resulting mixed effluent stream from said mixing device.

4,009,999

REAGENT SUPPLY CONTROL IN AUTOMATED FLUID ANALYSIS

Kent M. Negersmith, Carmel, N.Y., assignor to Technicon Instruments Corporation, Tarrytown, N.Y.

Filed May 29, 1975, Ser. No. 582,059
Int. Cl.² G01N *31/00, 33/00*
U.S. Cl. 23—230 R **6 Claims**



4. A method of analyzing liquid samples comprising the steps of:

flowing a stream of discrete aliquots of successive samples along respective first and second conduits from a source, each of which conduits includes a portion for reacting the successive samples with reagents and a portion for viewing the reaction product;

introducing a different reagent into said first and second conduits upstream of the reaction portion of each of the said conduits to form a sample-reagent mixture;

identifying the successive samples at the source; and

responsive to such identification discontinuing the introduction of said different reagent into either one of said first and second conduits and substituting therefor a pilot fluid for said reagent in one of said first and second conduits while introducing said reagent into the other of said first and second conduits for flow in phased relation at the same flow rate along the reacting and viewing portions.

4,010,000

APPARATUS FOR PRODUCING HALIDE PARTICLES

Scott Anderson, 1116 W. Church St., Champaign, Ill. 61820

Division of Ser. No. 259,858, June 5, 1972, Pat. No. 3,948,793, which is a division of Ser. No. 861,408, Sept. 26, 1969, Pat. No. 3,676,534. This application Apr. 23, 1975, Ser. No. 570,777
Int. Cl.² B01J *1/00*
U.S. Cl. 23—252 R **16 Claims**

1. Apparatus for producing discrete particles of purified metal halide, which apparatus comprises:

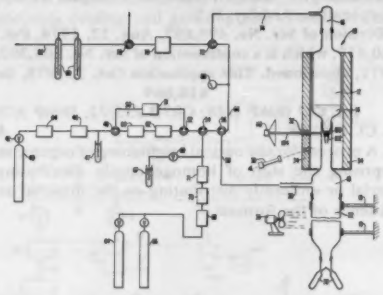
vessel means for holding molten halide;

conduit means in communication with said vessel means;

means for heating said vessel means and said conduit means;

a quenching chamber disposed downwardly from said conduit means

means for selectively passing a gas through molten halide within said vessel means and for selectively creating a pressure gradient between said vessel means and said chamber to urge molten halide to pass from said vessel means through said conduit means to discharge molten halide into said chamber; and,



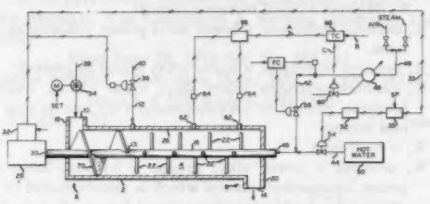
means for vibrating said conduit means whereby molten halide discharges from said conduit means in a continuous stream which separates in said chamber into droplet form.

4,010,001

CARBON BLACK PELLETIZING APPARATUS

Robert E. Dollinger, Bedford, Tex., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 396,815, Sept. 13, 1973, Pat. No. 3,931,377. This application Oct. 31, 1975, Ser. No. 627,717
Int. Cl.² B01J *2/00*
U.S. Cl. 23—252 R **2 Claims**



1. An apparatus for forming carbon black pellets comprising:

a housing having walls forming a longitudinal chamber extending therethrough, first and second end portions, a carbon black feed inlet and a pelleting fluid inlet positioned at the first end portion, and a pellet outlet positioned at the second end portion;

a main conduit for a supplemental fluid extending through the chamber and being rotatably mounted through the housing wall, said main conduit being connected to a source of heated supplemental fluid;

a plurality of secondary conduits extending radially outwardly from the main conduit along the length thereof, said secondary conduits being in fluid communication with the main conduit, terminating a preselected spaced distance from an inner surface of the housing wall and being open ended for discharge of said heated supplemental fluid therefrom;

means for rotating said main conduit and passing said secondary conduits along said housing wall;

means for measuring the temperature in said chamber and generating a signal responsive thereto;

means for controlling the temperature of said heated supplemental fluid responsive to said signal for maintaining the temperature in said chamber in a preselected range; and

means for moving the carbon black and pelleting fluid through said housing.

4,010,002

REACTOR FOR THE CONTINUOUS REACTIVATION OF ACTIVATED CARBON PARTICLES

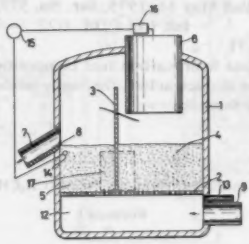
Josef Degel, Hattingen; Joachim Karweil, and Dietrich George, both of Essen, all of Germany, assignors to Bergwerksverband GmbH, Essen, Germany

Filed Oct. 3, 1975, Ser. No. 619,398

Claims priority, application Germany, Oct. 5, 1974, 2447603

Int. Cl.² B01D *15/06*; **B01J** *8/28*, *8/36*

U.S. Cl. 23—284 **7 Claims**



2. In a fluidized-bed reactor for continuous reactivation of activated carbon particles, a combination comprising a closed housing having a peripheral wall and a transverse perforated wall which divides said housing into a reaction chamber located above said perforated wall and a second chamber located below said perforated wall; outlet means communicating with said reaction chamber for discharging from the same carbon particles which have been reactivated; first inlet means communicating with said reaction chamber for admitting into the same carbon particles which are to be reactivated and which travel from said inlet means to said outlet means, said first inlet means including an inlet opening having a cross-sectional area equal to between substantially 5 – 25% of the surface area of said perforated transverwe wall; second inlet means communicating with said second chamber below said perforated transverse wall for admitting into the same hot gases required for reactivating of said carbon particles; and a substantially planar partition wall extending across the path of travel of said carbon particles in said reaction chamber and subdividing the latter into one compartment with which said first inlet means communicates and another compartment with which said outlet means communicates, said partition wall having free ends spaced from respective juxtaposed portions of said peripheral wall by distances equal to between substantially 10 – 30% of the cross-sectional dimension of said reaction chamber in a plane passing through said wall portions, said partition wall being laterally offset from the center of said reaction chamber in such a manner that said one compartment with which said first inlet means communicates is larger than said another compartment with which said outlet means communicates, the offset being between substantially 10 – 30% of the diameter which said reaction chamber has in the direction of offset, thereby providing in said one compartment a space which is sufficiently large so that the incoming spent carbon particles extending through said first inlet means are immediately distributed over a relatively large surface area in said one compartment of the reactor chamber.

4,010,003

REGENERATION APPARATUS

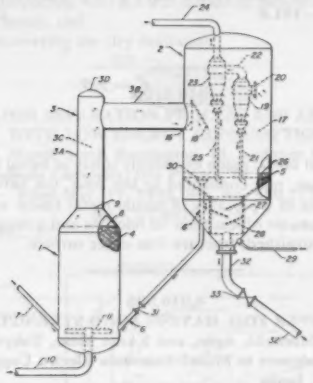
Richard P. Pulak, Palatine, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 429,422, Dec. 28, 1973, Pat. No. 3,953,175. This application Dec. 15, 1975, Ser. No. 640,995

The portion of the term of this patent subsequent to Apr. 27, 1993, has been disclaimed.

Int. Cl.² B01J *8/08*, *8/18*, *37/14*

U.S. Cl. 23—288 B **5 Claims**



1. An apparatus for oxidizing coke on spent catalyst which comprises in combination:

a. a spent-catalyst receiving chamber for containing a dense-phase fluidized bed of catalyst having a spent catalyst inlet means and a fresh-regeneration gas inlet means connected thereto to allow passage of spent catalyst and fresh regeneration gas respectively into said chamber and having a regenerated-catalyst/regeneration-gas outlet means connected thereto to allow passage of regenerated catalyst and regeneration gas from said chamber;

b. a transfer conduit positioned above said spent-catalyst receiving chamber and having a substantially vertical portion and a substantially horizontal portion in interconnection with said vertical portion, said vertical portion extending above said horizontal portion and having an inlet connected to the regenerated-catalyst/regeneration-gas outlet means and said horizontal portion extending into the side of a hereinafter described regenerated-catalyst receiving chamber and being provided with an outlet means within said chamber whereby regenerated catalyst and regeneration gas are carried from said spent-catalyst receiving chamber in admixture to said regenerated-catalyst receiving chamber, said portions of said transfer conduit being of sufficient internal volume to permit substantially complete CO oxidation and transfer of the heat of combustion to said catalyst therein:

c. a regenerated-catalyst receiving chamber for containing a dense-phase bed or regenerated catalyst, said chamber having a regenerated-catalyst outlet means and a spent-regeneration-gas outlet means connected thereto to allow passage of regenerated catalyst and spent regeneration gas from said chamber and said chamber being positioned adjacent to and at an elevation above said spent-catalyst receiving chamber sufficient to maintain at least a portion of said dense-phase bed of regenerated catalyst above said dense-phase fluidized bed of catalyst in said spent-catalyst receiving chamber; and,

d. a regenerated-catalyst recycle means to allow passage of regenerated catalyst directly from the regenerated-catalyst receiving chamber to the spent-catalyst receiving chamber.

4,010,004
VELVET FABRIC

Perry H. Brown, Villa Park, Calif., and Maurice H. Tremblay, Cockeysville, Md., assignors to Brunswick Corporation, Skokie, Ill.

Division of Ser. No. 483,240, June 26, 1974, Pat. No. 3,953,913, which is a division of Ser. No. 418,116, June 21, 1973, Pat. No. 3,838,983, which is a continuation of Ser. No. 212,468, Nov. 27, 1971, abandoned, which is a continuation of Ser. No. 861,024, Sept. 25, 1969, abandoned. This application Aug. 6, 1975, Ser. No. 602,255

Int. Cl.² B21C *37/04;* **B21F** *31/00;* **B23P** *3/10*

U.S. Cl. 29—191.6 **23 Claims**

1. A velvet fabric made essentially solely of metal and comprising a base, pile connected to the base, the velvet fabric being formed of a plurality of textile metal fibers, each fiber having a diameter of less than 50 microns and a rough, unmachined, unburnished, fracture free outer surface.

4,010,005
COPPER FOIL HAVING BOND STRENGTH

Shigeyoshi Morisaki, Ageo, and Kazuo Mase, Tokyo, both of Japan, assignors to Mitsui-Anaconda Electro Copper Sheet Co., Ltd., Japan

Filed June 10, 1974, Ser. No. 477,587

Claims priority, application Japan, June 23, 1973, 48-70447

Int. Cl.² B32B *15/20*

U.S. Cl. 29—195 **11 Claims**

1. A plated copper foil having high bond strength comprising a copper foil and an insoluble fine particle-containing metal plating formed thereon.

4,010,006
FLOW IMPROVERS

Roger Charles Price, Wantage, England, assignor to Exxon Research and Engineering Company, Linden, N.J.

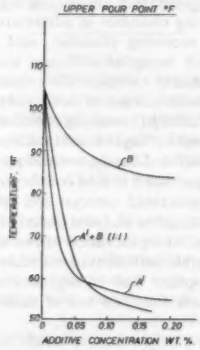
Continuation of Ser. No. 35,320, May 7, 1970, abandoned. This application Oct. 18, 1973, Ser. No. 407,812

Claims priority, application United Kingdom, May 9, 1969, 23776/69

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl. C10l *1/16*

U.S. Cl. 44—62 **1 Claim**



1. A fuel oil comprising 35 to 100 wt. % residue from the distillation of crude oil which is improved in its flow properties by containing in the range of about 0.01 to about 1 wt. % of a synergistic flow improving combination of a polymer blend comprising: a first polymer which is an oil soluble flow improving copolymer of ethylene and vinyl acetate having a molecular weight in a range of about 1000 to about 60,000 and containing about 86 to 97 mol % of ethylene; in combination with a second oil soluble flow improving polymer which is acyl polystyrene having a number average molecular weight in the range of 1000 to 25,000 and wherein at least half of said styrene units are acylated with C_{22}–C_{30} straight chain acyl groups; and wherein the weight ratio of said second polymer to said first polymer is in the range of about 5:1 to 1:5, said synergistic combination in said oil giving a pour point improvement greater than a like amount of either said first or second polymer alone.

4,010,007
THERMALLY LABILE RUST INHIBITORS

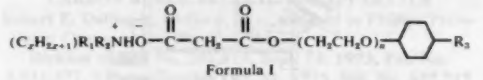
Joseph M. Bollinger, North Wales; Richard H. Hanauer, Furlong, and Warren H. Machleder, Blue Bell, all of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Filed May 14, 1975, Ser. No. 577,269

Int. Cl.² C10L *1/22*

U.S. Cl. 44—71 **5 Claims**

1. A distillate hydrocarbon fuel composition comprising a mixture of the surface active, thermally labile additive represented by the formula



Formula I

wherein $R_1 = R_2 = H$ or C_{1-4} alkyl; $x = 4$ to 30; $R_3 = C_4H_9$ to $C_{13}H_{23}$; and $n = 1$ to 12; with a distillate hydrocarbon fuel or multipurpose hydrocarbon fuel additive mixture wherein the additive is used at a treating level effective to provide rust inhibition to the hydrocarbon fuel composition.

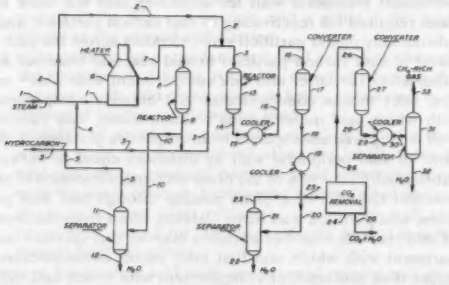
4,010,008
SUBSTITUTED NATURAL GAS VIA HYDROCARBON STEAM REFORMING

Hong-Kyu Jo, Des Plaines, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 550,900, Feb. 18, 1975, abandoned. This application Mar. 1, 1976, Ser. No. 662,984

Int. Cl.² C10G *11/28;* **C10K** *3/06*

U.S. Cl. 48—214 A **7 Claims**



1. A multiple-stage process for producing a methane-rich substitute natural gas which comprises the sequential steps of:

a. reacting a first portion of a fluid hydrocarbon charge stock with steam, in a first catalytic reaction zone, at steam reforming conditions including a temperature in the range of about 800° F. to about 1,025° F.;

b. removing at least about 90.0% of the steam from a first

portion of the resulting first reaction zone effluent, and then recycling the substantially steam-free first portion to said first reaction zone;

c. reacting a second portion of said fluid hydrocarbon charge stock with steam and a second portion of said first reaction zone effluent, in a second catalytic reaction zone, at steam reforming conditions including a temperature in the range of about 800° F. to about 1,025° F.; and,

d. recovering said methane-rich substitute natural gas from the resulting second reaction zone effluent.

4,010,009

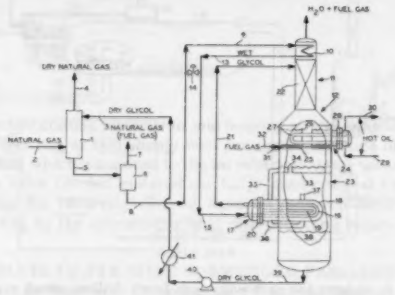
GLYCOL REGENERATION

G. A. Moyer, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Nov. 21, 1975, Ser. No. 634,107

Int. Cl.² B01D *53/14*

U.S. Cl. 55—32 **14 Claims**



1. A desiccant regenerator comprising

a. a regenerator vessel having a dry desiccant reservoir in the lower portion thereof.

b. first means for introducing wet desiccant into the upper portion of the regenerator vessel,

c. second means for withdrawing H_2O from the upper portion of the regenerator vessel,

d. third means for withdrawing of dry desiccant from said dry desiccant reservoir,

e. fourth means to reboil desiccant,

f. a collecting tray for collecting regenerated dry desiccant arranged

aa. within said regenerator vessel, and

bb. at an elevation between said fourth means to reboil the desiccant and said third means,

g. an indirect heat exchanger arranged at a lower elevation than said collecting tray,

h. a first fluid conduit establishing a fluid connection between said collecting tray and said heat exchanger so that the regenerated desiccant flows by gravity from the collecting tray through said first fluid conduit and said heat exchanger into indirect heat exchange with said wet desiccant before it is introduced into the regenerator vessel in step (b),

i. a second fluid conduit establishing a fluid connection between a source of wet desiccant and said heat exchanger,

j. a third fluid conduit establishing a fluid connection between said heat exchanger and said first means for introducing wet desiccant into said regenerator vessel, and

k. a fourth fluid conduit establishing a fluid connection between said indirect heat exchanger and said dry desiccant reservoir so that the regenerated desiccant after the indirect heat exchange with the wet desiccant flows by gravity from the heat exchanger into said dry desiccant reservoir.

9. A process for drying gas comprising

a. contacting said gas with a dry desiccant such as to produce a dry gas stream and a wet desiccant stream,

b. regenerating said wet desiccant stream by,

aa. passing it into the upper portion of a stripper,

bb. reboiling desiccant in reboiling means in said stripper,

cc. withdrawing an H_2O stream from the upper portion of said stripper,

dd. collecting dry desiccant at an intermediate level on a collecting tray arranged within said stripper below said reboiling means,

ee. passing the dry desiccant collected on said collecting tray by gravity flow through indirect heat exchange relationship with the wet desiccant before it enters the stripper, and

ff. recovering the dry desiccant.

4,010,010

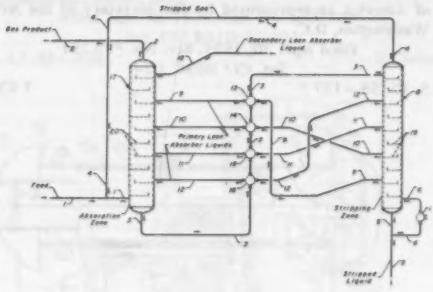
GAS-VAPOR SEPARATION PROCESS AND APPARATUS WITH LOW ENERGY CONSUMPTION

Dennis J. Ward, South Barrington, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Filed Mar. 17, 1975, Ser. No. 559,277

Int. Cl.² B01D *3/26*

U.S. Cl. 55—37 **7 Claims**



1. A process for the continuous removal of gaseous constituents from a feed comprising gaseous and vaporous constituents which process comprises the steps of:

i. passing said feed, stripped gases, a plurality of primary lean absorber liquids, and a secondary lean absorber liquid to a multistage absorption zone;

ii. absorbing into said primary and secondary lean absorber liquids at least a part of said vaporous constituents of said feed within said absorption zone;

iii. withdrawing from said absorption zone a rich absorber liquid comprising said lean absorber liquids, absorbed vapors and absorbed gases;

iv. withdrawing from said absorption zone a gas stream comprising gaseous feed constituents;

v. passing said rich absorber liquid to a multistage stripping zone and therein stripping said absorbed gases from said rich absorber liquid;

vi. withdrawing said absorbed gases from said stripping zone as stripped gases and passing said stripped gases to said absorption zone;

vii. withdrawing each of said primary lean absorber liquids from a separate stage of said multistage stripping zone and passing each of said primary lean absorber liquids to a separate stage of said multistage absorption zone; and,

viii. withdrawing and recovering from said stripping zone a liquid stream substantially free from gaseous feed constituents, said liquid stream comprising secondary lean absorber liquid and absorbed vaporous feed constituents.

4. An absorber-stripper for recovery of vaporous components from a feed containing gaseous and vaporous components which comprises in combination:

i. a vertically oriented multistage absorber vessel, having a lower inlet for absorber feed and stripped gas, an upper

inlet for secondary lean absorber liquid, a top outlet for a gas product, a bottom outlet for rich absorber liquid and vertically spaced intermediate inlets for primary absorber liquid;

ii. a vertically oriented multistage stripper vessel, having means for heat input situated in a lower part of said stripper vessel, a bottom outlet for stripped liquid, a top outlet for stripped gas, an upper inlet for rich absorber liquid and vertically spaced intermediate outlets for primary absorber liquid, the number of said intermediate outlets of said stripper vessel corresponding to the number of said intermediate inlets of said absorber vessel;

iii. conduits communicating said absorber liquid outlets in said stripper vessel with said absorber liquid inlets in said absorber vessel;

iv. a conduit communicating said bottom outlet of said absorber vessel with said upper inlet of said stripper vessel; and,

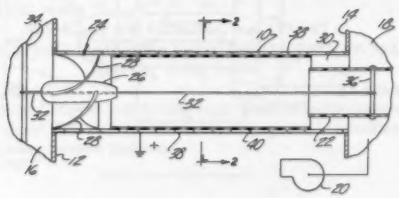
v. a conduit communicating said top outlet of said stripper vessel with said lower inlet of said absorber vessel.

4,010,011

ELECTRO-INERTIAL AIR CLEANER

Robert B. Reif, Grove City, Ohio, assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Apr. 30, 1975, Ser. No. 573,291
Int. Cl.² B03C *3/14*
U.S. Cl. 55—127 **1 Claim**



1. An air cleaner comprising a cylindrical flow tube having an inlet end for receiving dust-laden air, said flow tube also having an outlet end for discharging clean air and concentrated dust therethrough;

air spinner means within the inlet end of the flow tube for imparting circumferential swirl to the dust-laden air, whereby dust particles in the air stream are caused to migrate toward the tube wall as the stream moves toward the tube outlet end;

a clean air take-off pipe extending into the outlet end of the flow tube for directing clean air out of the tube to an engine, said pipe having a smaller diameter than the flow tube whereby concentrated dust is enabled to flow through the annular space between the pipe and flow tube; suction means communicating with the annular space for promoting dust concentrate flow therethrough;

said air spinner means and clean air take-off pipe being formed of dielectric material; said take-off pipe having a wire anchorage connected therein;

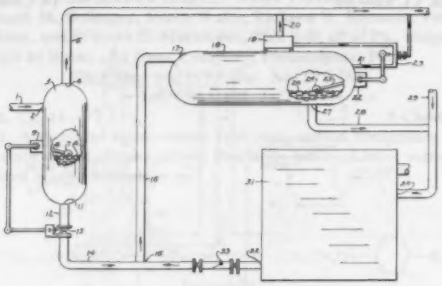
means for imparting an electrical charge to the flowing dust particles, comprising a negatively charged ionizer wire located on the longitudinal axis of the flow tube, said wire extending through the spinner means along the length of the flow tube and connected to said anchorage in the clean air take-off pipe to provide particle-charging corona along the entire length of the flow tube; means grounding the tube wall to maintain a particle-ionizing potential between the wire and wall; said tube wall being comprised of an outer conductive layer and an inner dielectric layer; said dielectric layer having sufficient thickness as to significantly weaken the electrostatic attractive force between the outer conductive layer and dust particles deposited on the surface of the dielectric layer, whereby aerodynamic forces are enabled to continuously move the deposited particles through the aforementioned annular space without allowing them to remain on the dielectric surface; said flow tube having an internal diameter of about one and one half inch, and said dielectric layer being Pyrex glass having a thickness of approximately one sixteenth inch.

4,010,012

TOTAL GAS CONTAINMENT SYSTEM

Phil H. Griffin, III; William A. Rehm; Martin L. Talley; Martin J. Sharki, and Woodrow E. Renfro, all of Houston, Tex., assignors to Dresser Industries, Inc., Dallas, Tex.

Filed Feb. 3, 1975, Ser. No. 546,249
Int. Cl.² B01D *19/00*
U.S. Cl. 55—169 **8 Claims**



1. A system for removing gas from drilling mud without allowing said gas to escape to the atmosphere before treatment to prevent contamination, comprising:

an enclosed mud-gas separator vessel;

a drilling mud inlet in said mud-gas separator vessel;

means for maintaining a minimum mud level in said mud-gas separator vessel;

a separator vessel gas outlet in said mud-gas separator vessel;

a separator vessel drilling mud outlet in said mud-gas separator vessel;

degassing means;

a degassing means drilling mud inlet in said degassing means, said degassing means drilling mud inlet located higher than said minimum mud level; and

enclosed conduit means connecting said separator vessel drilling mud outlet to said degassing means drilling mud inlet thereby preventing said gas from escaping to the atmosphere.

4,010,013

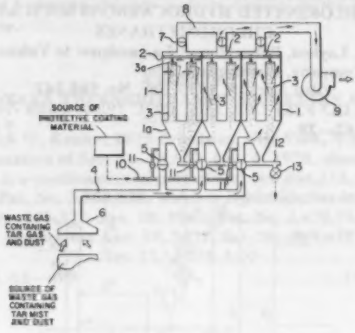
EQUIPMENT FOR TREATING WASTE GAS CONTAINING TAR MIST

Takao Murayama, Yokohama, Japan, assignor to Taisei Kensetsu Kabushiki Kaisha and Tokyo Gas Company Limited, both of Tokyo, Japan

Filed May 28, 1975, Ser. No. 582,413
Claims priority, application Japan, Apr. 8, 1975, 50-41792
Int. Cl.² B01D *46/04*
U.S. Cl. 55—286 **2 Claims**

1. Equipment for treating waste gas containing tar mist, comprising at least one bag housing, a valved waste gas supply duct connected to a source of waste gas having tar mist and dust therein and coupled to said housing for supplying waste gas containing tar mist to said housing, a valved discharge duct coupled to said housing for discharging treated waste gas from the housing, a filter bag mounting means in said housing and a filter bag mounted thereon in a position for filtering the waste gas passing through said housing from said waste gas

supply duct to said discharge duct, filter vibrating means operatively associated with said filter bag mounting means for removing accumulated filter material from the filter bag, a valved protective coating material supply duct connected to a source of protective coating material for a waste gas containing tar mist and coupled to said equipment for feeding said

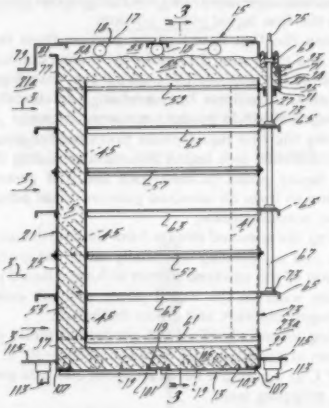

SOURCE OF PROTECTIVE COATING MATERIAL
WASTE GAS CONTAINING TAR GAS AND DUST
SOURCE OF WASTE GAS CONTAINING TAR MIST AND DUST

protective coating material to said housing on the same side of said filter bag as said supply duct for coating the side of said filter bag which is exposed to the tar mist containing waste gas, and a valve filtered material discharge duct coupled to said housing for removing filtered material removed from said filter bag by the operation of said filter vibrating means.

4,010,014
FLUID FILTER WITH SUBMERGED PASSAGES

Herbert L. Barnebey, Columbus, and Bertrand Japikse, Reynoldsburg, both of Ohio, assignors to Barnebey-Cheney Co., Columbus, Ohio

Continuation of Ser. No. 402,969, Oct. 3, 1973, abandoned, which is a continuation of Ser. No. 122,970, March 10, 1971, abandoned. This application June 5, 1975, Ser. No. 584,120
Int. Cl.² B01D *41/00*
U.S. Cl. 55—300 **6 Claims**

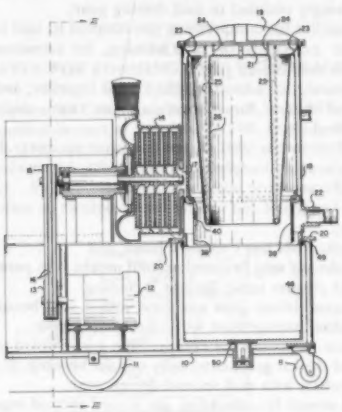


6. A filter construction characterized by the substantial elimination of gaskets to prevent bypass leakage of unfiltered fluid comprising a container having an inlet chamber for incoming fluid and having an outlet side spaced from the inlet chamber, said container having a horizontally disposed bottom wall and a vertically disposed side wall, a substantially uniform density mass of granular filter material substantially filling said container and supported on said bottom wall and confined by said side wall, flow guiding wall means embedded in said mass and supported in the container including an inlet area and an outlet area and acting to direct fluid flow through said mass from said inlet chamber to said outlet side and defining a filter zone in said mass consisting of all normal paths of fluid flow through said mass from said inlet area to said outlet area, said filter zone being located centrally within the mass of filter material and being bounded by a thick layer of filter material, said thick layer providing a sealing zone of filter material and all portions of said layer being at least as thick as any portion of the filter zone traversed by fluid flowing from the inlet area to the outlet area, said sealing zone serving to prevent bypassing of unfiltered fluid from the inlet area out of the mass and from the inlet chamber to the outlet side, and wedge shaped members embedded in the filter mass to provide for flow of all the granular filter material and eliminate formation of pockets wherein there is no flow of filter material.

4,010,015
INDUSTRIAL VACUUM CLEANER

Forrest W. Brown, Dover, Ohio, assignor to Invincible Vacuum Corporation, Dover, Ohio

Filed Jan. 30, 1976, Ser. No. 653,770
Int. Cl.² B01D *50/00*
U.S. Cl. 55—335 **5 Claims**



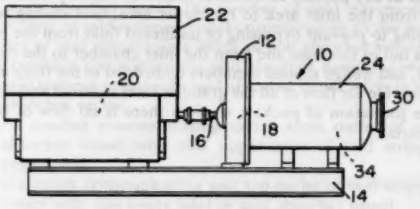
1. In a vacuum cleaner comprising a closed upper end upper tank portion, suction-producing means connected thereto, a removable closed lower end lower tank portion, means for bringing the lower tank portion into sealing contact at its upper end with the lower end of the upper tank portion and for moving it away therefrom, an air inlet and means for holding an inverted dust bag filter in the upper tank portion with the open end of the bag downward, the improvement comprising an interior ledge surrounded by the upper tank portion intermediate its upper and lower ends, a frame adapted to fit and positioned against the upper surface of the ledge and to seal against that ledge, the frame projecting above that ledge, means to attach the open end of a dust bag to the upright projecting frame portion, a deflector skirt adapted to fit and positioned against a lower surface of the ledge, the skirt projecting below the ledge to the lower end of the upper tank portion and spaced from the upper tank portion wall, the air inlet being positioned in the upper tank portion wall between its lower end and the interior ledge and opening into the lower tank portion in the space between the upper tank portion wall and the deflector skirt, whereby air may flow from the air inlet into the deflector skirt, and a plurality of means detachably connecting the deflector skirt to the frame operable from inside the deflector skirt.

4,010,016

GAS COMPRESSOR

Ronald L. Haugen, Mayfield, Ky., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Filed May 27, 1975, Ser. No. 581,218
Int. Cl.² B01D *46/00*
U.S. Cl. 55—473 **1 Claim**



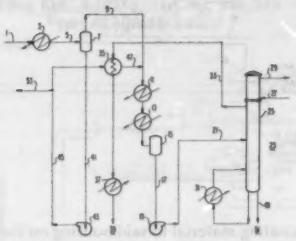
1. A gas compressor, comprising:
a gear housing;
a driving gear and at least one driven gear enclosed within said housing;
said gears being in mutual engagement for rotation in parallel axes;
said housing having parallel walls;
a power input shaft, in penetration of one of said walls, drivingly coupled to said driving gear;
an impeller for compressing gas coupled to said one driven gear externally of said housing, for common rotation with said driven gear;
first means for admitting gas to said impeller; and
second means for discharging gas from said impeller; wherein
said first and second means comprise an integral structure replaceably coupled to said housing in envelopment of, and concentric with, said impeller;
one of said first and second means defines an annular chamber;
said chamber has a closure head; and
the other of said first and second means is in penetration of said closure head; further including
a second driven gear enclosed within said housing and in mutual engagement with said driving gear;
a second impeller for compressing gas coupled to said second driven gear, externally of said housing, for common rotation with said second driven gear;
third means for admitting gas to said second impeller; and
fourth means for discharging gas from said second impeller; wherein
said third and fourth means comprises an integral structure replaceably coupled to said housing in envelopment of, and concentric with, said second impeller;
one of said third and fourth means defining a further annular chamber;
said further annular chamber has a closure head; and
the other of said third and fourth means is in penetration of said closure head of said further annular chamber;
a third driven gear enclosed within said housing and in mutual engagement with said driving gear;
a third impeller for compressing gas coupled to said third gear, externally of said housing, for common rotation with said third gear;
fifth means for admitting gas to said third impeller; and
sixth means for discharging gas from said third impeller; wherein
said fifth and sixth means comprises an integral structure replaceably coupled to said housing in envelopment of, and concentric with, said third impeller;
one of said fifth and sixth means defines another annular chamber;
said another annular chamber has a closure head; and
the other of said fifth and sixth means is in penetration of said closure head of said another annular chamber; and wherein
said second, fourth, and sixth means each include demister means for entraining and removing moisture from gas.

4,010,017

RECOVERY OF HYDROGEN CHLORIDE FROM CHLORINATED HYDROCARBONS SUCH AS CHLOROMETHANES

James E. Loyless, Baton Rouge, La., assignor to Vulcan Materials Company, Birmingham, Ala.

Filed Apr. 15, 1975, Ser. No. 568,242
Int. Cl.² F25J *3/02, 3/06;* **C07C** *19/00;* **C01B** *7/00*
U.S. Cl. 62—28 **7 Claims**



4. In a process for the recovery of hydrogen chloride from a methyl chloride thermal chlorinator gaseous product stream consisting essentially of from about 5 to about 30% hydrogen chloride and correspondingly from about 95% to about 70% of a chloromethanes mixture consisting essentially of from about 20% to about 60% methyl chloride, from about 20% to about 30% methylene chloride, from about 5% to about 15% chloroform and from about 1% to about 25% carbon tetrachloride, the improvement which comprises the following steps:
a. in a first zone cooling the gaseous stream to form a first gaseous phase portion and a first liquid phase portion;
b. passing the first gaseous phase portion and the first liquid phase portion from the first zone to a second zone and in the second zone separating the first gaseous phase portion from the first liquid phase portion;
c. passing the first liquid phase portion from the second zone to a third zone and in the third zone cooling the first liquid phase portion by passing the first liquid phase portion into indirect heat exchange relationship with a hydrogen chloride product recovery stream;
d. passing the first liquid phase portion after cooling from the third zone to a fourth zone and admixing the cooled first liquid phase portion with the first gaseous phase portion to form an admixed gaseous phase portion/liquid phase portion stream;
e. passing the admixed stream from the fourth zone to a fifth zone and condensing essentially all of the gaseous phase portion of the admixed stream to form a liquid phase feed stream wherein the liquid phase consists essentially of hydrogen chloride and chloromethanes;
f. passing essentially all of the condensed liquid phase feed stream at a temperature between about −30° C and about −10° C at a pressure between about 200 psia and 250 psia to a stripping zone;
g. maintaining the stripping zone at a pressure between about 200 psia and about 250 psia and at a temperature profile sufficient to retain essentially all of the chloromethanes in a liquid phase and to allow essentially all of the hydrogen chloride to separate in a vapor phase;
h. removing a first hydrogen chloride product recovery stream consisting of the hydrogen chloride vapor phase from the stripping zone;
i. passing the hydrogen chloride product recovery stream into said indirect heat exchange relationship in the third zone to cool the first liquid phase portion;

j. passing the hydrogen chloride product recovery stream from the third zone to a recovery zone; and

k. removing a second recovery stream consisting of the chloromethanes liquid phase from the stripping zone; the condensing of essentially all of the gaseous phase portion in step (e) and the stripping in step (g) allowing stripping at a temperature level substantially preventing any ice and hydrogen chloride hydrate buildup in the stripping zone.

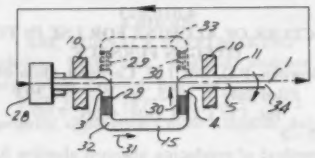
4,010,018
ROTARY THERMODYNAMIC APPARATUS AND METHOD

Frederick W. Kantor, 2875 Broadway, New York, N.Y. 10025

Continuation of Ser. No. 78,552, Oct. 6, 1970, abandoned, which is a continuation-in-part of Ser. No. 864,112, Oct. 6, 1969, Pat. No. 3,808,828, which is a continuation-in-part of Ser. No. 608,323, Jan. 10, 1967, Pat. No. 3,470,704. This application Apr. 18, 1975, Ser. No. 569,478

Int. Cl.² F25B *3/00*

U.S. Cl. 62—499 **19 Claims**



1. A rotary thermodynamic system including a rotatable fluid flow conduit having radially outwardly-directed and inwardly-directed sections in which conduit the thermodynamic pressure drop decreases with an increase in the rate of flow of working fluid through said system, and impedance control means for providing an increase of pressure drop for an increase in the rate of flow of working fluid through said conduit, the amount of said increase in pressure drop being effective to cause the overall pressure drop for said system to increase with an increase in said rate of flow, and thereby stabilizing the flow of working fluid through said conduit.

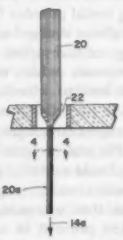
4,010,019
METHOD OF MAKING MICROCHANNEL PLATES

Henry B. Cole, East Woodstock, Conn., and Colin K. Yates, Dudley, Mass., assignors to American Optical Corporation, Southbridge, Mass.

Filed Nov. 19, 1971, Ser. No. 203,099

Int. Cl.² C03B *23/20*

U.S. Cl. 65—36 **3 Claims**



1. The method of making microchannel plates of a multiplicity of relatively large tubes of glass each having a preselected ratio of wall thickness to inner diametral size, said tubes being arranged in parallel side-by-side relationship with each other as a bundle and drawn longitudinally sufficiently to render openings through said tubes of desired microchannel size wherein the improvement comprises maintaning said ratio of wall thickness to inner diametral size of said tubes substantially constant throughout said method by the practice of no less than two drawing operations including the steps of:

heating said bundle in a zone adjacent one end thereof to a temperature such that the glasses of said tubes are substantially non-flowable and minimally softened for drawing with large pulling force;

drawing said heated bundle of glass tubes with said large pulling force slowly into a first section of reduced cross-sectional size having openings therethrough approaching but larger than said desired microchannel size with said ratio of wall thickness to inner diametral size of said tubes substantially unaltered;

heating a length of said first section of said bundle in a zone adjacent one of its ends to a higher drawing temperature such that the glasses of said tubes are sufficiently softened for drawing into a second section of further reduced cross-sectional size with a substantially smaller pulling force than said first mentioned pulling force to prevent breakage of said second section; and

redrawing said heated first section with said smaller pulling force sufficiently to reduce the size of said openings through said tubes to said desired microchannel size, said redrawing being effected relatively rapidly to maintain said ratio of wall thickness to the inner diametral size of said tubes substantially unaltered by minimizing the time of exposure of said tubes to said latter drawing temperature.

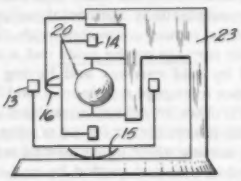
4,010,020
APPARATUS FOR FORMING CURVED SURFACES BY ROTATION

Stephen Wyden, 16 Court St., Brooklyn, N.Y. 11241

Continuation-in-part of Ser. No. 70,298, Sept. 3, 1970, abandoned. This application Dec. 18, 1973, Ser. No. 425,901

Int. Cl.² C03B *19/04*, *13/14*

U.S. Cl. 65—142 **8 Claims**



1. An apparatus for forming curved surfaces, wherein the material being formed is responsive to magnetic fields, comprising:

a frame,

a vessel rigidly attached to the frame,

a track of circular section attached to the frame,

a pair of rotatable magnets attached to the track,

means of moving each of the pair of magnets along the track attached between the magnets and the track, and

means of rotating each of the magnets around the vessel attached between each of the magnets and the track,

whereby a magnetically responsive material may be rotated in a plane by the rotation of the pair of magnets.

7. An apparatus for forming curved surfaces on material, comprising:

a support frame forming a supporting track of circular section,

means to control eccentricity of a vessel attached to the track,

an upper supporting member attached to the eccentricity control means,

a vessel attached to the supporting member,

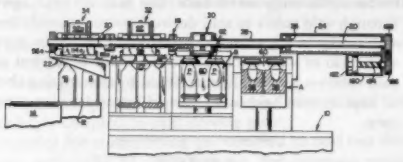
a lower supporting member attached to the vessel,
means of controlling eccentricity and centering of the vessel attached to the support frame and to a lower end of the roller supporting member,
means of driving the support members attached to the upper support member and to the track, and
rotation of the support members when the axis of rotation is set at an angle of 45° to form a hyperboloid surface.

4,010,021

TRANSFER MECHANISM FOR HIGH SPEED PRESS AND BLOW INDIVIDUAL SECTION GLASSWARE FORMING MACHINE

Thomas Vincent Foster, Doncaster, England, assignor to Emhart Industries, Inc., Farmington, Conn.

Division of Ser. No. 462,078, April 18, 1974, Pat. No. 3,914,120. This application Aug. 18, 1975, Ser. No. 605,738
Claims priority, application United Kingdom, Nov. 23, 1973, 54389/73
Int. Cl.² C03B *9/00*
U.S. Cl. 65—229 **10 Claims**



1. In a glassware forming machine section comprising a frame having at least two stations horizontally spaced apart longitudinally of the frame and wherein the first of such stations is utilized to form a parison and another of said stations is utilized to further form the parison, a transfer mechanism for moving a parison from the first such station to said another station including at least one guide rod extending longitudinally of the frame over the said stations, a carriage supported on said rod for substantially horizontal reciprocation therealong, a reversible motor connected with the carriage for reciprocating the carriage on the guide rod, a neck ring structure supported by said carriage and having parts movable toward each other to engage a parison at said first station and away from each other to release a parison at said another station, rack and pinion means for so moving said neck ring parts including a rack which is connected with at least one neck ring part and which is carried by and slidable on said carriage and a pinion which is rotatable with said guide rod and slidable therealong with the carriage, and driven reversible means connected with said guide rod for rotating said guide rod.

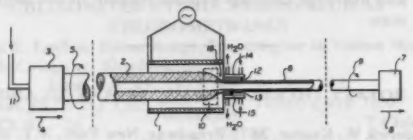
4,010,022

APPARATUS FOR MAKING FUSED SILICA TUBING

Herbert Schul, Hanau am Main, Germany, assignor to Heraeus-Schott Quarzschmelze GmbH, Hanua am Main, Germany

Filed June 16, 1975, Ser. No. 587,449
Claims priority, application Germany, June 25, 1974, 2430428
Int. Cl.² C03B *23/04, 21/00*
U.S. Cl. 65—277 **9 Claims**

1. An apparatus for making fused silica tubes from a hollow cylindrical tube of fused silica which comprises a heating zone, means for supplying heat to said heating zone, means for continuously feeding said hollow cylindrical tube to said heating zone, means for rotating said hollow cylindrical tube as it is fed to said heating zone, means downstream of said heating zone for continuously withdrawing said tube from said heating zone, means for rotating the same about its own longitudinal axis as it is withdrawn from said heating zone, means for applying pressure to the interior of said tube while it is being withdrawn from said heating zone and rotated, and calibrating means downstream of said heating zone for calibrating the still-plastic tube immediately upon leaving the heating zone, said calibrating means being disposed adjacent to said heating



zone, said calibrating means comprising at least two tube confronting flat graphite plate means disposed upon a support and at a distance from one another corresponding to the desired outside diameter of said tube, said support means including a conduit therein and means for passing a coolant through said conduit.

4,010,023

MANUFACTURE OF ALUMINA FOR USE IN THE BASIC OXYGEN FURNACE

James J. Bowden, P.O. Box 127, Cortland, Ohio 44410

Filed July 2, 1975, Ser. No. 592,393
Int. Cl.² C22B *1/08*; **C21C** *7/00*
U.S. Cl. 75—3 **5 Claims**

1. The method of producing low-cost alumina for use as a flux in the manufacture of steel in a steel-making furnace, comprising:
skimming the slag from the top of a melt of scrap aluminum, permitting the skimmed slag to solidify,
subjecting the solidified slag to an agitating operation to remove at least some of the large particles of aluminum therefrom for remelting and for reducing the remainder of the solidified slag to particle and powdery form, and
screening the remainder of the agitated slag to separate the particle form from the powdery form the latter being adapted for use in the steel-making furnace.

4,010,024

PROCESS FOR PREPARING METAL HAVING A SUBSTANTIALLY UNIFORM DISPERSION OF HARD FILLER PARTICLES

Sanford Baranow, Souquoit, N.Y., assignor to Special Metals Corporation, New Hartford, N.Y.

Filed June 16, 1975, Ser. No. 587,026
Int. Cl.² B22F *9/00*
U.S. Cl. 75—.5 BC **4 Claims**

1. A process for preparing metal having a substantially uniform dispersion of hard filler particles, which comprises the steps of: admixing metal powder from the group consisting of nickel, cobalt and alloys thereof and oxide particles having a negative free energy of formation at 1000° C of at least as great as that of aluminum oxide; milling the mixture for a period of time sufficient to effect a substantially uniform dispersion of said oxide particles in said metallic powder, said milling being in an oxygen containing atmosphere, said atmosphere containing sufficient oxygen to substantially preclude welding of particles of said metallic powder to other particles of said metallic powder, said oxygen being present in an amount greater than that encountered when powders are milled in the air often present in a mill, said oxygen being supplied from an external gaseous source or from an oxygen-bearing compound which is admixed with said metal powder and oxide particles; said dispersion strengthened powder having a Fisher No. of less than 15; heat treating said dispersion strengthened powder to remove excess oxygen therefrom; and subsequently blending said dispersion strengthened powder with powder which is not readily reduceable by hydrogen.

4,010,025
OXIDATION AND SINTER-RESISTANT METAL POWDERS AND PASTES

Anthony V. Fraioli, Essex Fells, N.J., and John A. DeRosa, Queens Village, N.Y., assignors to Plessey Incorporated, Melville, N.Y.

Division of Ser. No. 565,835, April 7, 1975, Pat. No. 3,966,463, which is a continuation-in-part of Ser. No. 496,714, Aug. 12, 1974, abandoned. This application Feb. 6, 1976, Ser. No. 655,847

Int. Cl.² B22F *9/00*; **B01J** *23/74*

U.S. Cl. 75—.5 AC **4 Claims**

1. The method of preparing finely divided nickel powder of increased oxidation resistance comprising:

forming an acidic solution of nickel and a minor proportion of a zirconium oxide precursor;

forming an alkaline hydrazine reducing solution;

adding said acidic nickel solution to said reducing solution very slowly under conditions of agitation;

separating, washing and drying the resulting precipitate;

firing said precipitate in a reducing atmosphere at about 450° C.

4,010,026
ARC FURNACE STEELMAKING

David Engledow, Rotherham, England, assignor to British Steel Corporation, London, England

Filed July 7, 1975, Ser. No. 593,272

Claims priority, application United Kingdom, July 22, 1975, 32354/75

Int. Cl.² C21C *5/52*

U.S. Cl. 75—11 **13 Claims**

13. A method of steelmaking in an electric arc furnace, in which a blend of particulate high carbon and low carbon iron-bearing material is continuously charged into a furnace at a rate dependent on the electrical and chemical energy reactions therein, the continuous charging being effected after melt-down of an initial scrap basket charge, and in which a cycle is completed after a number of tappings concluding a like number of sub-cycles, continuous charging additionally being effected immediately after each said sub-cycle (except the last) on to a residue of molten metal left in the furnace after the previous tap.

4,010,027
PROCESSES FOR STEEL MAKING BY OXYGEN REFINING OF IRON

James White, Ranby Retford, England, assignor to Lafarge Fondu International, Neuilly sur Seine, France

Filed May 15, 1975, Ser. No. 577,840

Claims priority, application France, May 15, 1974, 74.16937

Int. Cl.² C21C *7/02*; **C22B** *9/10*

U.S. Cl. 75—52 **9 Claims**

1. A process for obtaining low phosphorus steel by oxygen refining of liquid iron in the presence of a slag containing lime, alumina, silica and iron oxides characterized in that at the beginning of the operation is added to the liquid metal a charge of a composition calculated such that during all the refining operation the slag contains a solid phase consisting substantially only of calcium oxide, which disappears at the end of operation and only at this moment, and a liquid phase which remains substantially saturated in magnesium oxide and such that at the end of the operation a slag is obtained containing:

CaO	40 to 60 %
SiO_2	5 to 25 %
MgO	2.5 to 15 %
Al_2O_3	5 to 25 %
Iron oxides expressed as Fe_2O_3	10 to 35 %

-continued

P_2O_5	0.5 to 10 %

with

MgO/R_2O_3 less than .65

$R_2O_3/SiO_2 + P_2O_5$ greater than 0.8

MgO/SiO_2 between 0.3 and 0.7

Al_2O_3/Fe_2O_3 between 0.10 and 3.0, wherein R_2O_3 is the sum of Al_2O_3 and iron oxides in said slag.

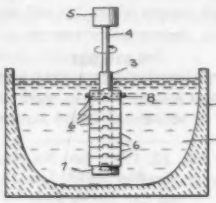
4,010,028
BONDED CALCIUM CARBIDE ARTICLE AND METHOD FOR MAKING THE SAME

Donald A. Irwin, Sr., Naugatuck; Gordon H. Madge, Watertown; Charles F. Kloss, Waterbury, and Allen L. Stone, Cheshire, all of Conn., assignors to Uniroyal Inc., New York, N.Y.

Filed July 29, 1974, Ser. No. 492,801

Int. Cl.² C21C *7/02*

U.S. Cl. 75—53 **22 Claims**



1. A non-circular, self-sustaining shaped article, useful for reducing the sulfur content of molten steel, comprising granular calcium carbide bonded with a crosslinked polymeric bonding agent selected from the group consisting of polyurethane, polyesters, phenolic resins, epoxy resins, liquid styrene-butadiene copolymers, polybutadiene, isobutylenediene copolymers, polysulfide polymers and ethylene-propylene-non-conjugated diene terpolymers.

4,010,029
METHOD FOR INCREASING THE USE OF SCRAP AND IRON OXIDES BY BASIC OXYGEN FURNACE

David L. McBride, Pittsburgh, Pa., assignor to Energy and Materials Conservation Corporation, Pittsburgh, Pa.

Filed Nov. 14, 1975, Ser. No. 632,071

Int. Cl.² C21C *5/28*

U.S. Cl. 75—60 **5 Claims**

1. A method for producing steel in oxygen converter whereby the relative proportion of scrap metal used is increased which comprises charging scrap metal into said converter, superheating molten iron in a separate vessel to a temperature of 2600° to 3000° F without altering the initial composition of the molten iron, and then charging said superheated molten iron into said scrap containing converter, followed by the injection of gaseous oxygen and fluxes to obtain a steel product of desired composition.

4,010,030
REMOVAL OF ARSENIC, ANTIMONY AND BISMUTH FROM MOLTEN COPPER WITH SULFUR HEXAFLUORIDE

Robert O. French, Salt Lake City, Utah, assignor to Kennecott Copper Corporation, New York, N.Y.

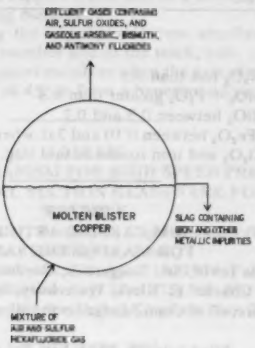
Filed Sept. 8, 1975, Ser. No. 611,154

Int. Cl.² C22B *15/00*

U.S. Cl. 75—76 **6 Claims**

1. A process for removing impurities selected from the

group consisting of bismuth, antimony, arsenic, and mixtures thereof from molten copper, comprising contacting said mol-


EFFLUENT GASES CONTAINING AIR, SULFUR OXIDES, AND GASEOUS ARSENIC, BISMUTH, AND ANTIMONY FLUORIDES
MOLTEN BLISTER COPPER
SLAG CONTAINING IRON AND OTHER METALLIC IMPURITIES
MIXTURE OF AIR AND SULFUR HEXAFLUORIDE GAS

ten copper with sulfur hexafluoride gas; forming gaseous fluorides of said impurities; and discharging said gaseous fluorides from said copper while it is still molten.

4,010,031

ELECTROPHOTOGRAPHIC SYSTEM

Masaru Onishi, and Koichi Tomura, both of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 22, 1975, Ser. No. 542,906
Claims priority, application Japan, Jan. 23, 1974, 49-10543
Int. Cl.² G03G *0/00*
U.S. Cl. 96—1 TE **8 Claims**

1. An electrophotographic apparatus comprising: a photoconductive layer of a predetermined conductivity type having a pair of first and second main surfaces opposite to each other and including majority carriers having a predetermined polarity for receiving an imaging light to be recorded to generate hole-electron pairs in that portion of said layer adjacent to said second main surface, a transparent electrode layer disposed on the side of the second main surface of the photoconductive layer, a dielectric recording medium disposed in spaced opposed relationship with the first main surface of the photoconductive layer with a gap therebetween, a source of DC recording voltage coupled across said transparent electrode layer and said dielectric recording medium for applying a DC recording voltage with a polarity making said transparent electrode layer identical in polarity to the majority carriers present in said photoconductive layer, said DC recording voltage being for transferring those carriers of said hole-electron pairs identical in polarity to said majority carriers present in said photoconductive layer to said first main surface of said photoconductive layer thereby to form an electrostatic latent image corresponding to said imaging light on said first main surface of said photoconductive layer and also to transfer said electrostatic latent image to said dielectric recording medium, and a carrier transparent blocking layer sandwiched between said second main surface of said photoconductive layer and said transparent electrode layer, said carrier blocking layer being for permitting said imaging light to pass to the second main surface of the photoconductive layer and also to prevent those carriers identical in polarity to said majority carriers present in said photoconductive layer from being injected into said photoconductive layer from said transparent electrode layer.

2. An electrophotographic apparatus as claimed in claim 1 wherein said transparent carrier blocking layer is polyvinyl carbazole.

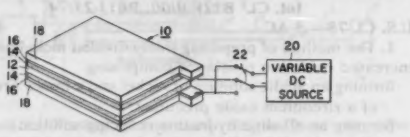
3. An electrophotographic apparatus as claimed in claim 1 wherein said transparent carrier blocking layer is a photoconductive material having the opposite polarity from the material of said photoconductive layer.

4,010,032

PROCESS FOR PRODUCING COLOR SEPARATION RECORD UTILIZING ELECTROLUMINESCENT MATERIAL

Yoshio Ono, No. 25-2, Nishirendaino-cho, Murasakino, Kita, Kyoto, and Takashi Sakamoto, No. 16, Sagasono-cho, Narutaki, Ukyo, Kyoto, both of Japan

Filed Mar. 31, 1975, Ser. No. 563,647
Int. Cl.² G03C *7/00*; G03F *1/00*; G03C *1/92*
U.S. Cl. 96—31 **4 Claims**



1. A process for producing a color separation record for color printing comprising the ordered steps of:

radiating a color image onto a photosensitive material through a color separation filter;

placing an electroluminescent member onto said photosensitive material;

applying an electrical potential to the electroluminescent member of a given magnitude and a predetermined polarity;

radiating said color image onto said electroluminescent member and said photosensitive material through the color separation filter;

reversing the polarity of and lowering the value of the electrical potential applied to the electroluminescent member;

radiating the color image onto said electroluminescent member through a color compensating filter; and

increasing the magnitude of the electrical potential applied to the electroluminescent member to radiate the luminescent image thereof onto the photosensitive material in alignment with the color image.

4,010,033

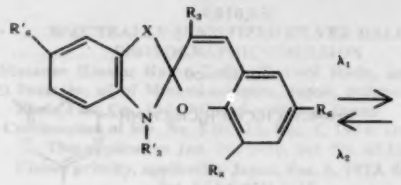
PHOTOSENSITIVE LAYER AND METHOD OF FORMING A PHOTOGRAPHIC IMAGE THEREFROM

Jacques V. Metzger, Marseille, France, assignor to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly-sur-Seine, France

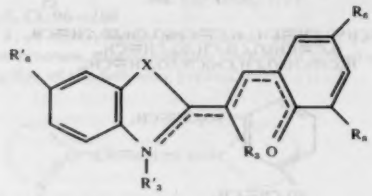
Continuation of Ser. No. 492,487, July 29, 1974, abandoned. This application Mar. 10, 1976, Ser. No. 665,388
Claims priority, application France, Aug. 3, 1973, 73.28538
Int. Cl.² G03C *5/24, 1/72, 1/52*
U.S. Cl. 96—48 R **22 Claims**

1. A photographic element comprising a support having thereon a photosensitive layer which contains:

a. at least one heterocyclic photochromic spiropyrane which can exist in two forms and is selectively converted from one form to the other on irradiation according to the scheme



(I)

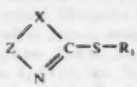


(II)

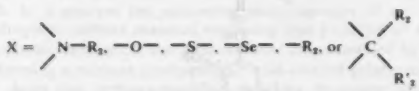
wherein R_3 is methyl, phenylthio, phenyl, chloro, bromo, methoxy, hydroxy, naphthyl, 4-chlorophenyl, 4-bromophenyl, 4-hydroxyphenyl, or 4-methoxyphenyl;

R_3' is methyl, isopropyl, n-hexyl, benzyl, or phenylethyl;
R_6 is nitro;
R_8' is hydrogen, methylthio or phenylthio;
R_8 is methoxy; and
X is thio, seleno, imido, oxo, aza, or dialkylcarbo;
λ_1 is a wavelength in the ultraviolet range and λ_2 is a wavelength in the visible range;

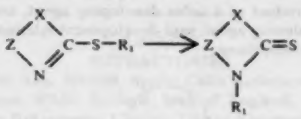
b. at least one ortho-substituted nitrogen-containing heterocyclic thioether of the following formula:



wherein



Z is a group of atoms required to complete a five-membered ring or a five-membered substituted ring, R_1, R_2, and R_2' are alkyl or acylalkyl groups, the open form of the spiropyrane being capable of acting as a catalyst in the conversion of the thioether to a thione in accordance with the following reaction:



so that a latent image produced on exposure of the spiropyrane to light is amplified,

c. at least one agent for producing a visible image from the amplified latent image, such agent comprising
1. at least one metal salt of a carboxylic acid which can be reduced by thiones and is a behenate, resinate, naphthenate, benzoate, or stearate of silver, cadmium, calcium, copper, cobalt, tin, manganese, magnesium, nickel, lead, or zinc, or
2. at least one compound which together with the thione, forms a complex of the formula:

$$ML_2$$

where M represents halide or thiocyanate and L represents the thione, and is zinc, cobalt, or nickel halide or zinc or cobalt thiocyanate, and

d. at least one component which will fix the spiropyrane in the open form, such component being a semiconducting oxide or a cobalt, copper, or nickel salt.

4,010,034

METHOD FOR ADJUSTING THE BROMIDE ION CONCENTRATION IN A PHOTOGRAPHIC PROCESSING SOLUTION

Tsuneo Suga, Tokyo; Masaru Kanbe; Shinobu Korematsu, both of Hachioji; Toshiaki Takahashi, Musashimurayama, and Ken-ichi Kishi, Machida, all of Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 398,187, Sept. 17, 1973, abandoned. This application July 8, 1975, Ser. No. 594,128

Claims priority, application Japan, Sept. 22, 1972, 47-94600

Int. Cl.² G03C *5/32, 5/38, 5/30*

U.S. Cl. 96—60 BF **7 Claims**

1. A method for adjusting the bromide ion concentration in a photographic processing solution selected from a developer, a bleach-fixing solution and a fixing solution, which comprises:

contacting said processing solution with particles consisting essentially of an insoluble bismuth compound selected from the group consisting of bismuth trioxide, bismuth tetroxide, and bismuth pentoxide so that said particles adsorb an excess bromide ion in said processing solution;

separating said particles from said processing solution;

and removing the adsorbed bromide ion from the separated particles whereby said particles are made reusable for repeating said contacting step in order to adjust the bromide ion concentration.

4,010,035

LIGHT-SENSITIVE SILVER HALIDE COLOR PHOTOGRAPHIC MATERIAL AND A PROCESS FOR DEVELOPING THEREOF

Mitsuto Fujiwhara; Takaya Endo, and Ryosuke Satoh, all of Hino, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Filed May 15, 1975, Ser. No. 577,931

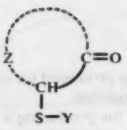
Claims priority, application Japan, May 29, 1974, 49-60411

Int. Cl.² G03C *5/30, 1/06*

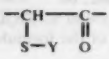
U.S. Cl. 96—66.3 **10 Claims**

1. A light-sensitive silver halide colour photographic mate-

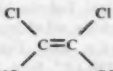
rial, which comprises a development releasing inhibitor compound which liberates a development inhibiter and simultaneously produces a colorless compound on reacting with an oxidation product of a color developing agent, and a photographic hardening agent, said development releasing inhibitor compound comprising:

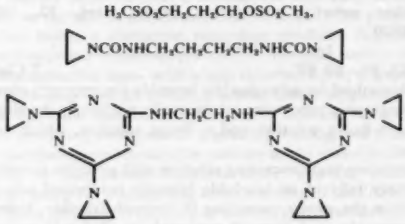


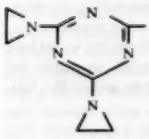
wherein Z, together with the

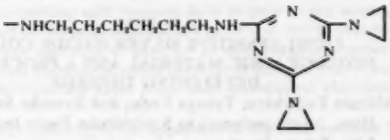


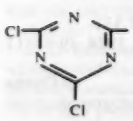
group, represents an alicyclic ring selected from the group consisting of 5-, 6- and 7-membered rings; and a heterocyclic ring selected from the group consisting of a piperidone, a lactone having a 4- to 7-membered ring, a pyrrolidone, a hydantoin and an oxyindole, each of which ring may be substituted and may have condensed rings, and Y represents a group that forms a development inhibitor when the sulfur atom of the thioether bond is split from the said ring to release an aryl mercapto compound, a heterocyclic mercapto compound, a thioglycol, cysteine or glutathione, and said hardening agent is selected from the group consisting of











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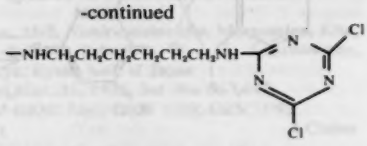
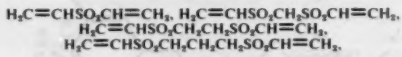
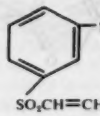
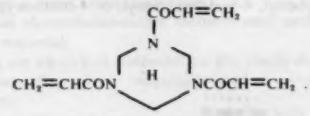






and



4,010,036

LITH-TYPE SILVER HALIDE PHOTOSENSITIVE MATERIAL CONTAINING A P-BENZOQUINONE DERIVATIVE

Tsuneo Suga; Ken-ichi Kishi; Shinobu Korematsu; Masaru Kanbe, and Toshiaki Takahashi, all of Hino, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

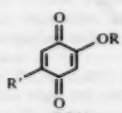
Continuation-in-part of Ser. No. 371,853, June 20, 1973, abandoned. This application May 22, 1975, Ser. No. 579,792

Claims priority, application Japan, June 30, 1972, 47-64957

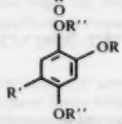
Int. Cl.[2] G03C *1/06, 1/28, 5/30*

U.S. Cl. 96—66.3 **4 Claims**

1. A lith-type silver halide photosensitive material comprising high contrast silver halide grains containing at least 50 mole per cent of silver chloride, less than 40 mole percent of silver bromide and less than 5 mole per cent of silver iodide based on total silver halide, the size of said grains being 0.05 to 0.5 microns in average diameter, said material further comprising, in an amount of 10 mg to 10g per mole of silver halide, a compound represented by the following general formula I or II:



I



II

wherein R is alkyl, aryl, aralkyl or acyl; R′ is hydrogen or —OR; and R′′ is hydrogen or acyl.

4,010,037

SPECTRALLY SENSITIZED SILVER HALIDE PHOTOGRAPHIC EMULSION

Masanao Hinata; Haruo Takei; Tadashi Ikeda, and Mitsuo Iwamoto, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

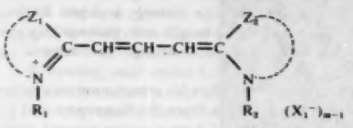
Continuation of Ser. No. 530,125, Dec. 6, 1974, abandoned. This application Jan. 28, 1976, Ser. No. 653,995

Claims priority, application Japan, Dec. 6, 1973, 48-138345

Int. Cl.² G03C *1/14*

U.S. Cl. 96—100 **12 Claims**

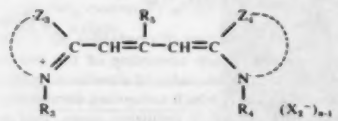
1. A silver halide photographic emulsion containing, in combination, supersensitizing amounts of at least one sensitizing dye of the following general formula (I)



(I)

wherein Z_1 and Z_2 each represents an atomic group required for forming a benzimidazole ring and the ring formed by Z_2 or the ring formed by Z_1 is substituted in the 5-position with a chlorine atom, a methoxycarbonyl group, an ethoxycarbonyl group, a propoxycarbonyl group, a butoxycarbonyl group, a methylcarbonyl group or an ethylcarbonyl group; R_1 and R_2 each represents an aliphatic group and at least one of R_1 and R_2 represents an alkyl group having a sulfo group; X_1 represents an acid anion; and m is 1 or 2, and when m is 1 the dye forms an inner salt;

and at least one sensitizing dye of the following general formula (II)



(II)

wherein Z_3 represents an atomic group required for forming a benzoxazole ring or a β-naphthoxazole ring; Z_4 represents an atomic group required for forming a benzothiazole ring, a benzoselenazole ring, a β-naphtholthiazole ring or a β-naphthoselenazole ring; R_3 and R_4 represents an alkyl group having a carboxy group or an alkyl group having a sulfo group; R_5 represents a hydrogen atom or an alkyl group; X_2 represents an acid anion; and n is 1 or 2, and when n is 1 the dye forms an inner salt.

4,010,038

PROCESS FOR PRODUCING MICROCAPSULES

Hiroshi Iwasaki, Kawanishi; Shunsuke Shioi, Daito, and Jujiro Kouno, Takatsuki, all of Japan, assignors to Kanzaki Paper Manufacturing Co., Ltd., Tokyo, Japan

Filed Apr. 1, 1975, Ser. No. 563,974

Claims priority, application Japan, Apr. 10, 1974, 49-41306

Int. Cl.² B01J *13/02*; C09D *11/00*

U.S. Cl. 106—22 **6 Claims**

1. In a process for producing microcapsules of complex hydrophilic colloid material enclosing fine particles of a hydrophobic substance, the improvement characterized by:

forming a mixture containing an acid-treated gelatin and at least one carboxy-modified cellulose derivative used as the hydrophilic colloid material for coacervation, the amount of the cellulose derivative being 1/7 to 1/40 the amount of the gelatin by weight, the cellulose derivative having an average polymerization degree of 50 to 1,000 and a carboxyl substitution degree of 0.4 to 1.5, and

effecting coacervation of the colloid material solution at a pH of 4.8 to 6.0 and at a temperature higher than the gelling point of the acid-treated gelatin.

4,010,039

REFRACTORIES

Salvador de Aza, Madrid, Spain; Colin Richmond, Worksop, and James White, Retford, both of England, assignors to Gr-Stein Refractories Limited, United Kingdom

Continuation-in-part of Ser. No. 351,949, April 17, 1973, abandoned, which is a continuation-in-part of Ser. No. 98,272, Dec. 15, 1970, abandoned. This application Nov. 8, 1974, Ser. No. 522,225

Claims priority, application United Kingdom, Feb. 17, 1970, 61383/70

Int. Cl.² C04B *35/48*

U.S. Cl. 106—57 **8 Claims**

1. A solid-solid bonded basic refractory having a chemical composition (calculated as the oxides) consisting essentially of MgO in the amount 25% to 97% by weight; CaO 0.9% to 44% by weight; ZrO_2 2% to 57% by weight; and SiO_2 0.5% to 23.5% by weight; the said basic refractory containing a silicate and an alkaline earth metal zirconate, the CaO/SiO_2 ratio being greater than 1.4, there being at least one part by weight of said alkaline earth metal zirconate for each three parts by weight of said silicate, and the CaO to $SiO_2 + ZrO_2$ ratio being between 0.32 and 1.40, said alkaline earth metal zirconate being capable of co-existing with any basic solid refractory phase at a temperature of at least 1700° C. in which solid-solid bonding is maintained between said zirconate and said solid refractory phase in the presence of a liquid phase at a temperature of at least 1700° C. and in which said refractory forms a skeleton of said zirconate bonded to said refractory phase at a temperature of at least 1700° C.

4,010,040

MODIFIED MIXING TECHNIQUE FOR CARBONACEOUS STOCK

Roy E. Booth, Berea, Ohio, assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 5, 1974, Ser. No. 529,889

Int. Cl.² C08L *95/00*

U.S. Cl. 106—281 R **1 Claim**

1. A method of compounding graphitizable compositions which comprise introducing a carbon particle filler into a hot-shear mixer, adding from about 25 to about 70 pph of water, adding from about ¼ to about 5 pph of a dispersant, premixing at a temperature at least about the boiling point of water (100° C) until most of the moisture is eliminated, adding a binder, and mixing for about an additional one hour at a temperature above the melting point of the binder.

4,010,041

ANHYDRIDE DERIVATIVES

Malcolm Leslie Dean, Bayswater, and Bruce Leary, Frankston, both of Australia, assignors to Dulux Australia Ltd., Melbourne, Australia

Filed Nov. 29, 1974, Ser. No. 528,548

Claims priority, application Australia, Dec. 11, 1973, 5950/73

Int. Cl.² C09K *3/00*

U.S. Cl. 106—287 R **3 Claims**

1. A liquid paint composition which has a viscosity of less than 10 poise at 25° C and at a non-volatile content of at least 80% by weight and which comprises a hydroxy-group containing derivative of a polybasic acid anhydride selected from trimellitic anhydride and pyromellitic anhydride together with a cross-linking agent suitable for curing the said derivative by reaction with hydroxy groups in said derivatives, said derivative containing carboxyl groups in addition to hydroxy groups and comprising two monoesters per derivative molecule of

diols selected from ethylene glycol, propylene glycol, butane diol and hexane diol and di-hydroxy esters of said diols with dicarboxylic acids, the derivative being further characterised in that it has an acid value of 40 mgm KOH per gm minimum and comprises two hydroxyl groups, which are the sole hydroxyl groups in the molecule, depending from separate carbon atoms which constitute part of a chain of not more than 40 covalently linked carbon and oxygen atoms, the said separate carbon atoms being located at opposite ends of and not more than three atoms from the extremities of the chain.

4,010,042

PROCESS FOR REMOVING PHOSPHOSILICATE COATINGS

Charles D. Boyer, Natrona Heights, Pa., assignor to Allegheny Ludlum Industries, Inc., Pittsburgh, Pa.

Filed Jan. 15, 1976, Ser. No. 649,382
Int. Cl.² B08B *3/08*
U.S. Cl. 134—2 **9 Claims**

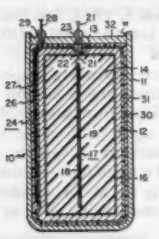
1. A process for removing a phosphosilicate coating from a metallic substrate, without deleteriously affecting the substrate, comprising contacting the coating with an aqueous solution containing an alkali metal fluoride in a concentration effective to remove the phosphosilicate coating and maintaining said solution in contact with said coating for a time sufficient to remove the phosphosilicate coating without deleteriously affecting the substrate.

4,010,043

LITHIUM-IODINE CELLS AND METHOD FOR MAKING SAME

Alan A. Schneider, Reisterstown, Md., assignor to Catalyst Research Corporation, Baltimore, Md.

Division of Ser. No. 564,755, April 3, 1975. This application Mar. 12, 1976, Ser. No. 666,161
Int. Cl.² H01M *2/00*
U.S. Cl. 29—523.2 **6 Claims**



1. A method for making a lithium iodine cell comprising:

A. forming a lithium metal sheet into a receiving vessel having an aperture therethrough and an opening thereinto, said vessel including at least one extending portion having a shape conforming dimensionally to said opening for sealing closed said opening;

B. forming a cathode current collector by welding a plastic coated lead wire to a metallic screen-like material;

C. positioning the cathode current collector within the receiving vessel and the lead wire through said aperture;

D. heating a cathode material to a flowable consistency;

E. completely filling said receiving vessel with the heated cathode material and chilling said filling vessel to solidify said material; and

F. while said material is solidified, positioning said extending portion in abutting relationship with the solidified material to sealing closed said opening under pressure to form an anode encasing member.

4,010,044

BATTERY VENT

Ernest C. Schaumburg, West Lakeland, Minn., assignor to Standard Oil Company, Chicago, Ill.

Continuation-in-part of Ser. No. 545,032, Jan. 29, 1975, abandoned. This application Mar. 4, 1976, Ser. No. 664,017
Int. Cl.² H01M *2/12*
U.S. Cl. 429—82 **15 Claims**

1. A battery vent comprising:

a. a first member;

b. a second member positioned adjacent to said first member;

c. a vent means;

d. a narrow passage formed between said first and second members in gaseous communication with said vent means, said narrow passage having a depth between 0.001 and 0.015 inch and a length such that venting gases must travel at least 0.18 inch through said narrow passage; and

e. means on said second member for attachment to a battery through which gas can pass from the battery to said narrow passage, wherein said battery vent acts to inhibit battery explosions.

4,010,045

PROCESS FOR PRODUCTION OF III–V COMPOUND CRYSTALS

Robert A. Ruehrwein, 67 Hilton Ave., Garden City, N.Y. 11530

Division of Ser. No. 424,565, Dec. 13, 1973, Pat. No. 3,975,218, and a continuation-in-part of Ser. No. 248,724, April 28, 1972, abandoned. This application Apr. 27, 1976, Ser. No. 680,854
Int. Cl.² H01L *7/36*
U.S. Cl. 148—174 **5 Claims**

1. A process for the production of crystalline III–V compounds selected from the group consisting of the nitrides, phosphides, arsenides and antimonides of aluminum, gallium, indium, and mixtures thereof, which comprises combining in the vapor phase, while excluding oxidizing gases, first and second gas streams,

said first gas stream comprising an inert carrier gas and a gaseous mixture formed by the reaction in the absence of hydrogen of a Group III trihalide and and a Group III element, said first gas stream being hydrogen-free; and

said second gas stream comprising an inert carrier gas and a gaseous substance selected from the group consisting of a Group V element and a volatile Group V compound;

thereby to obtain a crystalline form of at least one of said III–V compounds.

4,010,046

METHOD OF EXTRUDING ALUMINUM BASE ALLOYS

William C. Setzer, Creve Coeur, Mo.; Richard D. Lanam, Hamden; Joseph Winter, New Haven, both of Conn., and Douglas L. Graham, Ballwin, Mo., assignors to Swiss Aluminium Ltd., Chippis, Switzerland

Filed Mar. 4, 1976, Ser. No. 663,661
Int. Cl.² C22D *1/04*
U.S. Cl. 148—11.5 A **13 Claims**

1. A method for extruding high strength aluminum base alloys which comprises providing a cast alloy billet, the alloy billet consisting essentially of from 0.04 to 1.0% iron, from 0.02 to 0.2% silicon, from 0.1 to 1.0% copper, from 0.001 to 0.2% boron, balance essentially aluminum, conducting a hot extrusion of said billet at a temperature between 600°–950° F, cooling the extruded product and stretching the cooled product less than 3 percent of the length of the extruded shape.

4,010,047

METHOD FOR STABILIZING A SUPERCONDUCTOR

Sigrun Frohmader, and Günther Ziegler, both of Erlangen, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Apr. 30, 1975, Ser. No. 573,075

Claims priority, application Germany, May 16, 1974, 2423712

Int. Cl.² C21D *1/56, 1/00*

U.S. Cl. 148—20.3 13 Claims

1. A method for stabilizing a superconductor having at least one core which consists at least partially of an intermetallic superconductive compound of the type A_3B consisting of at least two elements and which is provided with a sheath of an alloy containing an electrically highly normal conducting metal and one element of the compound comprising:

a. disposing the superconductor and a gaseous transport agent within a vessel containing no other active gases;

b. heating said vessel to the point where a chemical transport reaction takes place in which the element of the compound in the sheath reacts with the transport agent to form a gaseous reaction product, and where at another point within the vessel a reverse reaction takes place despositing the element of another surface therein.

4,010,048

BONDING AGENT FOR FUSING PORCELAIN TO NONPRECIOUS METAL ALLOY

John A. Tesk, Woodridge; Henrietta M. Severa, Chicago; Ronald P. Dudek, River Grove, and Peter Kosmos, Alsip, all of Ill., assignors to Howmedica, Inc., New York, N.Y.

Filed Dec. 24, 1974, Ser. No. 536,327

Int. Cl.² B23K *35/34*

U.S. Cl. 148—24 15 Claims

1. A bonding agent for fusing a metal alloy with porcelain consisting essentially of the following constituents in percentages by weight:

Constituent	Proportional Range
Gold Powder (15 microns)	34.0–52.0
Porcelain	13.1–30.6
Zirconium Oxid (10 microns)	4.4–8.74
Liquid Flux(capable of reaction to form layers of tenacious oxides on alloy to which porcelain adheres)	Balance

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4,010,049

COLUMBIUM-STABILIZED HIGH CHROMIUM FERRITIC STAINLESS STEELS CONTAINING ZIRCONIUM

Charles R. Rarey, Eighty-Four, Pa., assignor to Jones & Laughlin Steel Corporation, Pittsburgh, Pa.

Filed Oct. 6, 1975, Ser. No. 619,732

Int. Cl.² C22C *38/22, 38/28*

U.S. Cl. 148—37 3 Claims

1. A stabilized fully ferritic stainless steel in the wrought condition having good ductility, and characterized by a minimal amount of surface streaking, consisting essentially of:

Carbon, 0.10% maximum;

Chromium, from 11% to 30%;

Molybdenum, up to 3.0%;

Nitrogen, residual quantities:

Columbium, from about 0.1% total to 0.3% in solid solution, and in no event less than (7.7 × % carbon - % zirconium in excess of 6.5 × % nitrogen);

Zirconium, from 6.5 × % nitrogen to 0.25% in excess of (6.5 × % nitrogen × 7.6% carbon); and

balance iron and residual impurities.

4,010,050

PROCESSING FOR ALUMINUM NITRIDE INHIBITED ORIENTED SILICON STEEL

Edward G. Choby, Jr., Pittsburgh, Pa., assignor to Allegheny Ludlum Industries, Inc., Pittsburgh, Pa.

Filed Sept. 8, 1975, Ser. No. 611,060

Int. Cl.² H01F *1/04*

U.S. Cl. 148—113 8 Claims

1. In a process for producing electromagnetic silicon steel having a cube-on-edge orientation and a permeability of at least 1850 (G/O_e) at 10 oersteds, which process includes the steps of: preparing a melt of silicon steel containing, by weight, up to 0.07% carbon, from 2.8 to 4.0% silicon, from 0.03 to 0.24% manganese, from 0.01 to 0.09% of material from the group consisting of sulfur and selenium, from 0.015 to 0.04% aluminum, up to 0.02% nitrogen, up to 0.5% copper and up to 0.0035% boron; casting said steel; hot rolling said steel; cold rolling said steel at a reduction of at least 75% decarburizing said steel; and final texturing said steel; the improvement comprising the steps of coating the surface of said steel with a base composition consisting essentially of:

a. 100 parts, by weight, of at least one substance from the group consisting of boron, boron compounds, sulfur, sulfur compounds, selenium, selenium compounds, and oxides and hydroxides of magnesium, calcium, aluminum, titanium and manganese; and

b. 4 to 120 parts, by weight, of at least one substance from the group consisting of amides and imides of organic and inorganic acids;

and final texture annealing said steel with said coating thereon; said steel's texture and magnetic properties being, in part, attributable to said substance from the group consisting of amides and imides.

4,010,051

BEDDING OF LOAD-CARRYING MEMBERS ON LOAD-SUPPORTING FOUNDATIONS

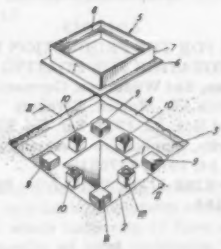
Michael H. Ingrey, and Donald J. Watson, both of Chessington, England, assignors to Corrosion Technical Services Limited, Brentford, England

Filed Sept. 4, 1975, Ser. No. 610,346

Claims priority, application United Kingdom, Sept. 9, 1974, 39215/74

Int. Cl.² E03F *5/02*

U.S. Cl. 156—71 8 Claims



1. A method of bedding a load-carrying member on a supporting foundation comprising the steps of:

a. providing at least one axially compressible mould having two open ends;

b. placing one of said open ends of said mould on said foundation with the other of said open ends directed upwardly;

c. providing a bonding agent, said bonding agent including a thermosetting resin capable of bonding to both the underside of said member and to said foundation;

d. placing said bonding agent in said mould;

e. placing said member on said upwardly directed open end of said mould filled with said bonding agent after said mould has been placed on said foundation;

f. causing said member to compress said mould axially until said member is itself pressed into contact with said bonding agent through said upwardly directed open end, and said bonding agent is pressed into contact with said foundation through one of said open ends;

g. containing said bonding agent laterally by said mould; and,

h. effecting hardening of said bonding agent.

4,010,052

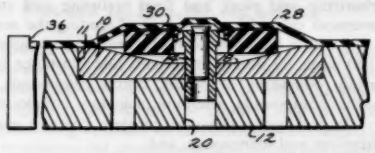
MOLDING VALVE STEMS TO RUBBER ARTICLE

Charles E. Edwards, Muscatine, Iowa, assignor to Bandag Incorporated, Muscatine, Iowa

Filed Sept. 24, 1974, Ser. No. 508,995

Int. Cl.² B29H *15/06*

U.S. Cl. 156—120 **10 Claims**



1. A method of attaching a valve stem having a passageway therethrough to a curable rubber article comprising inserting a valve stem in a mold plate having a chamber therein, setting the stem and plate in a main mold leaving a portion of one end of the stem exposed in said chamber, inserting a valve stem plug in the passageway at the exposed end of the valve stem, surrounding the exposed end of the valve stem in the chamber of the mold plate with a ring of uncured valve base material, placing an uncured rubber article in the main mold and covering the plugged exposed end of the valve stem and the valve base material with the uncured rubber article, applying pressure and curing the rubber article and the valve base material simultaneously in the main mold and then pushing the plug entirely clear of said exposed end of the valve stem to separate a generally circular portion of the cured article material positioned over the plug from the remainder of the article to provide a unitary fully opened passageway through the valve stem.

4,010,053

PROCEDURE FOR THE PRODUCTION OF A HOLLOW BODY OF ROTATION FOR COATING EQUIPMENT

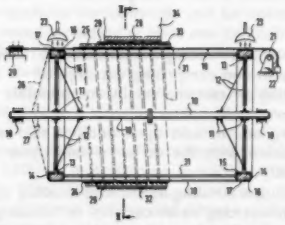
Horst Bokelmann, Bad Wildungen, Germany, assignor to Metzeler Kautschuk AG, Munich, Germany

Filed Nov. 22, 1974, Ser. No. 526,384

Claims priority, application Germany, Nov. 22, 1973, 2358212; May 14, 1974, 7476815

Int. Cl.² B21B *31/08*; B31C *1/00*; B65H *81/00*

U.S. Cl. 156—154 **13 Claims**



1. A procedure for the production of a self-supporting, hollow body of rotation which can be used for processing by way of coating, doubling, dyeing, cleaning, production or other pertinent processes applied on products having large, plane surface areas, such as units or webs of textiles and particularly of floor covering, carpets, woven, knitted or braided goods and further on thin sheets, paper, photographic paper, cardboard, etc., which body of rotation is not suitable for transportation and which could not otherwise be manufactured on known type of machine tools, which comprises mounting immediately in the intended operating position of the body of rotation wheel tires in parallel distance of and centered arrangement to each other on a shaft; adjoiningly placing a plurality of fiber-glass fabric strips along the outer circumference of said tires and perpendicular thereto so that they extend longitudinally in parallel to said shaft; bonding one end of said strips to the contact surface of the outer circumference of one of the wheel tires; pulling said strips under an adjustable tension over the contact surface of the other wheel tire and then bonding the other end of said strip to the last mentioned contact surface while the tension is maintained, so that the strips form an enveloping cylinder which is only contacted and supported by said wheel tires; consolidating said cylinder by impregnation with plastics or synthetic resins suitable for setting; and upon setting, increasing the wall thickness and stiffness of the cylinder jacket by helical application of layers of impregnated fiber-glass strips which are preferably applied on tangential direction; applying reinforcing belt of wire or tape or of other sections followed by a finishing coat of plastic material or synthetic resin to form an outer skin which will compensate for any irregularities of the fiber-glass fabric strips and of the reinforcing belt; upon subsequent setting subjecting the finishing coat to mechanical surface treatment; and permanently retaining the wheel tires and shaft in the body of rotation.

4,010,054

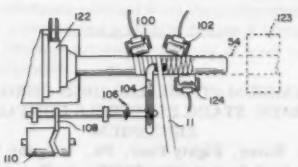
THERMOPLASTIC FILAMENT WINDING PROCESS

Rexford H. Bradt, Claypool, Ind., assignor to Albert L. Jeffers, Fort Wayne, Ind.

Continuation-in-part of Ser. No. 139,441, May 3, 1971, abandoned. This application Oct. 3, 1973, Ser. No. 403,052

Int. Cl.² B65H *81/00*, *81/08*

U.S. Cl. 156—173 **8 Claims**



1. A method for continuously forming cylindrical articles, such as pipe, from a continuous strand of thermoplastic material, which comprises the steps of conveying the strand to a rotating mandrel heating at least the surface of the strand prior to the strand reaching said mandrel and to a temperature high enough to make at least the surface of the thermoplastic material of the strand sticky, wrapping the hot strand on the mandrel at a pre-selected rate using a reciprocatory motion to form a crossed helical wrap thereon, internally chilling said mandrel thereby to chill the inner surface of the formed pipe to a temperature at which the thermoplastic material adjacent the mandrel becomes rigid, and sequentially and incrementally removing the pipe from the mandrel while the pipe is being continuously formed with a rotating gripper means turning at substantially the same speed as the mandrel.

4,010,055

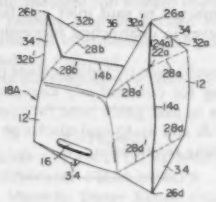
METHOD OF PRODUCING THREE-DIMENSIONALLY SHAPED INFLATABLE SAFETY BAG

Takashi Oka, Tokyo; Hiroshi Iwasaki, Kamakura, and Eiichi Kato, Tokyo, all of Japan, assignors to Nissan Motor Co., Ltd.; Ikeda Bussan Co., Ltd. and Toray Industries, Inc., all of, Japan

Filed June 6, 1975, Ser. No. 584,342

Int. Cl.² B31F *1/00*

U.S. Cl. 156—226 14 Claims



1. A method of producing a three-dimensionally shaped inflatable bag for the protection of a vehicle passenger in collision of the vehicle, the method comprising the steps of:

a. making a flat quadrilateral bag of a flexible and substantially gas impermeable sheet material so as to provide the bag with a flat front sheet, a flat back sheet, and four sides surrounding said sheets, the front sheet having, in a corner region thereof, two curved joint lines imaginarily drawn respectively to intersect two of the four sides which define said corner region and to meet at a point on an imaginary and straight third line drawn obliquely to said two sides to divide said corner region into two portions thereof, said two curved lines being symmetrical with respect to said third line;

b. sealing the flat bag;

c. folding the two portions of said corner region along said third imaginary line so that said two curved lines overlap each other;

d. making a joint in the folded corner region along the overlapped curved joint lines;

e. similarly folding a corner region and making a joint in the back sheet of said flat bag in a corner region thereof opposite said corner region of the front sheet; and

thereby producing a three-dimensionally shaped inflatable bag which fits into a vehicle.

4,010,056

PROCESS FOR CONTINUOUSLY BONDING STAPLE FIBERS INTO AN ESSENTIALLY NON-TWISTED YARN

Werner Naegeli, Winterthur, Switzerland, assignor to Pavena AG, Basel, Switzerland

Filed June 19, 1972, Ser. No. 263,935

Claims priority, application Germany, Dec. 22, 1971, 2163958

Int. Cl.² D06M *13/00*

U.S. Cl. 156—296 16 Claims

1. A process for the continuous bonding of staple fibers into an essentially non-twisted yarn, comprising the steps of introducing an excess amount of liquid containing an adhesive in distributed form into a fiber arrangement composed of staple fibers, squeezing out the excess liquid from the fiber arrangement, compacting the fiber arrangement by application of pressure into a moist slubbing, feeding the moist slubbing into contact with a condensing vapor atmosphere for condensing vapor of the vapor atmosphere at the slubbing and setting the adhesive by drying of the slubbing for transforming the slubbing into an adhesively bonded yard.

4,010,057

PRINTING APPARATUS

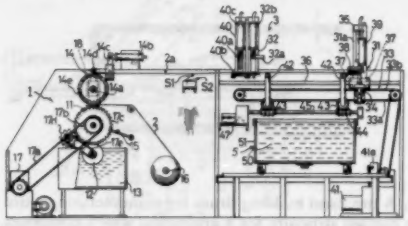
Motoyasu Nakanishi, Isezakishi, Japan, assignor to Kabushiki Kaisha Kobayashi, Isezakishi, Japan

Filed July 11, 1975, Ser. No. 595,305

Claims priority, application Japan, Aug. 12, 1974, 49-92127; Dec. 26, 1974, 50-148426

Int. Cl.² B44C *1/16*

U.S. Cl. 156—384 26 Claims



1. A printing apparatus comprising:

a printing means for printing a pattern on a surface of a thin film;

a basin containing a liquid;

feeding means for feeding said printed thin film with the printed surface face up onto the surface of said liquid so that the thin film floats on the liquid;

means for submerging at least a part of an object, the surface of which is to be printed with said pattern into said liquid while said object is kept in contact with the upwardly facing pattern-printed surface of said thin film for transferring the pattern onto the surface of the object by the pressure of said liquid; and

a thin film removing means for removing said thin film from the surface of said object on which said pattern is printed.

4,010,058

TIRE BUILDING DRUM

Donald C. Kubinski, Wadsworth, and Robert S. Riggs, Stow, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed May 16, 1975, Ser. No. 578,282

Int. Cl.² B29H *17/16, 17/22*

U.S. Cl. 156—415 23 Claims

1. A tire building drum including a shaft and a pair of drum end assemblies each having a plurality of segments disposed about the shaft which cooperate to form shoulders of the drum, and a plurality of bead positioning fingers disposed about the shaft adjacent to and axially outward of the shoulders which cooperate to position the tire bead, a righthand-lefthand screw disposed coaxially of the shaft, a nut disposed within the shaft adjacent to each end assembly, each nut being cooperable with a respective threaded portion of said screw to move axially of the shaft in response to rotation of the screw and characterized by means for actuating the segments and the fingers of the drum comprising a plurality of slides rigidly connected to each nut and disposed slidably in the respective end assemblies for movement parallel to the shaft, a first rigid link associated with each said slide and pivotally connected at its respective ends to one of said segments and to the associated slide, and a second rigid link associated with each said slide and pivotally connected at its respective ends to one of said fingers and to the associated slide.

4,010,059

TIRE BAND BUILDING DRUM

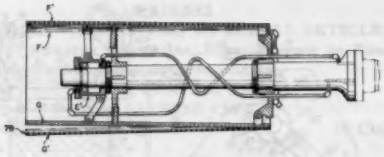
Toshinori Yabe, Kodaira, Japan, assignor to Bridgestone Tire Company Limited, Tokyo, Japan

Filed Oct. 10, 1975, Ser. No. 621,611

Claims priority, application Japan, Oct. 11, 1974, 49-117554

Int. Cl.² B29H *17/14, 17/20*

U.S. Cl. 156—420 **5 Claims**



1. A tire band building drum for manufacturing a tire band of a carcass structure for a green tire, which comprises:

a drive shaft located axially of said drum;

a collapsible drum portion axially extending over a predetermined length from the forward end thereof, said collapsible drum portion including a plurality of first arcuate drum segments circumferentially equi-distantly spaced apart from each other and a plurality of second arcuate drum segments each interposed between said first arcuate drum segments to collectively define said collapsible drum portion surface in a substantially cylindrical form during building said tire band thereon;

a flange member securely mounted on said drive shaft and pivotally supporting at its outer peripheral edge the rear ends of said first and second arcuate drum segments for allowing said first and second arcuate drum segments to pivot around their pivotal points thereby making both sets of said first and second arcuate drum segments movable in opposite directions in inclined relation with said drive shaft; and

drum collapsing means mounted on said drive shaft forwardly of said flange member to rotate with said first and second arcuate segments about said drive shaft and to rotate said first and second arcuate drum segments around their pivotal points.

4,010,060

METHOD AND APPARATUS FOR MAKING A COAXIAL ELECTRIC CABLE

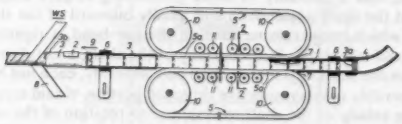
Eduard Bochenek, Hofheim, Taunus; Heinz Heumann, Rheydt, and Viktor Pohl, Walsum, all of Germany, assignors to AEG-Telefunken Kabelwerke AG, Rheydt, Germany

Continuation of Ser. No. 459,327, April 9, 1974, abandoned. This application June 16, 1975, Ser. No. 586,859

Claims priority, application Germany, Apr. 9, 1973, 2317766; Apr. 9, 1973, 7313416[U]

Int. Cl.² B65H *8/00*

U.S. Cl. 156—425 **6 Claims**



1. An apparatus for making an axially hollow, coaxial electric cable including support sleeves arranged in an axial series in an unattached end-to-end contacting relationship and a conductor helically wound on the support sleeves; comprising in combination:

a. a winding station for helically winding the conductor about the support sleeves;

b. a guide tube accommodating and maintaining the support sleeves within its confines in an axially aligned relationship; said guide tube including

1. an inlet end through which the support sleeves are introduced in sequence into said guide tube;

2. a discharge end situated in said winding station in the immediate vicinity of a location where the conductor runs onto the support sleeves;

3. means defining a longitudinal, slotlike, throughgoing opening extending in the length dimension of said guide tube along at least one length portion thereof;

c. means connected to said inlet end for introducing the support sleeves in unattached succession into said guide tube; and

d. a feeding mechanism including means projecting through said opening for continuously engaging successive support sleeves in said guide tube for continuously shifting them towards and up to said discharge end in an end-to-end contacting relationship.

4,010,061

PAPER ROLL SPLICING METHOD AND APPARATUS

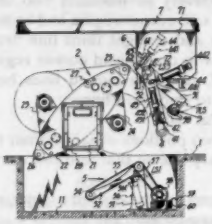
Masatero Tokuno, Nishinomiya, Japan, assignor to Rengo Co., Ltd., Osaka, Japan

Filed Apr. 18, 1973, Ser. No. 352,313

Claims priority, application Japan, Dec. 16, 1972, 47-126594

Int. Cl.² B65H *19/16*

U.S. Cl. 156—504 **10 Claims**



1. An apparatus for splicing a leading end of a fully wound web roll, which has not yet been unwound, with a web running from an exhausting web roll which is being continuously unwound, comprising:

a mill roll stand which contains opposing side frames, a rotary frame rotatably mounted between said opposing side frames, said rotary frame being provided with means for rotatably mounting said fully-wound web roll and said exhausting web roll in a mutually opposing relationship, means for rotating the rotary frame to place the fully-wound web roll in the splicing position and the exhausting web roll in the unwinding position;

web guiding means disposed on the rotary frame for guiding the web from the exhausting web roll placed in the unwinding position;

means for rotating, up to the speed of the running web, the fully wound web roll which is placed in the splicing position prior to the splicing operation;

a web pushing roll provided near the fully-wound web roll placed in the splicing position, the web pushing roll being rotatably supported by a pair of arms pivotally suspended from a stationary member disposed above the mill roll stand, and being adapted to move toward and away from the fully-wound web roll while guiding the web from the exhausting web roll on a portion of the web pushing roll surface facing toward the fully-wound web roll;

an intermediate roll disposed between the fully-wound web roll placed in the splicing position and the web being guided on the surface of the web pushing roll, said intermediate roll being rotatably supported by a pair of arms

which are pivotally suspended from said stationary frame so as not to interfere with the movement of said pair of arms supporting the web pushing roll, said pair of arms supporting said intermediate roll being adapted to be shortened and lengthened so as to place the intermediate roll into and out of the path of the motion of the web pushing roll;

means for moving the arms supporting the web pushing roll to push the running web by said web pushing roll toward the fully-wound web roll placed in the splicing position or to push the intermediate roll toward the fully-wound web roll with the running web interposed between the web pushing roll and the intermediate roll placed in the path of the web pushing roll; and

means for cutting the running web from the exhausting roll.

4,010,062

METHOD OF AND APPARATUS FOR SPLICING THE ENDS OF FILM STRIPS

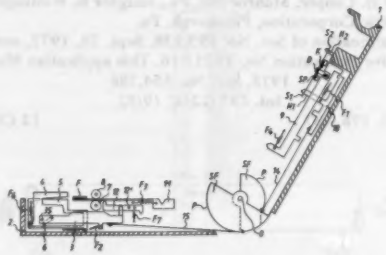
Hermann Müller, Munich; Dieter Sandl, Ottobrunn; Jürgen Sylla, Munich, and Rolf Schröder, Baldham, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed Nov. 26, 1974, Ser. No. 527,288

Claims priority, application Germany, Nov. 28, 1973, 2359363

Int. Cl.² B31F *5/00*; B65H *19/00*; G03D *15/04*

U.S. Cl. 156—506 **26 Claims**



1. An apparatus for making a splice joint at the ends of a pair of film strips, comprising a film press having two parts which are hinged-together for relative swinging movement about an axis between an open position and a closed position; first means on said press for holding said ends of said film strips in overlapping relationship with each other; second means on said press for holding a self-adhesive film splice having a release paper; and third means, also on said press and actuated by relative movement of said parts from said open to said closed position, for sequentially cutting through said overlapped film ends to form a butt joint, stripping said release paper from said film splice, and pressing said film splice over said butt joint, so that the splice joint is completed and the film ready for removal from said press prior to subsequent relative movement of said parts from said closed position back to said open position.

4,010,063

PEDAGOGIC THERMAL PULSE SEALING APPARATUS

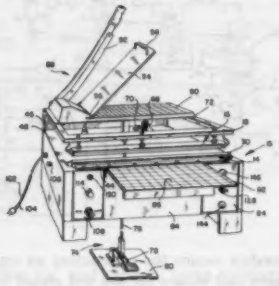
Howard Natter, c/o Honatech, Inc. 400 Walnut St., Yonkers, N.Y. 10701

Filed Apr. 2, 1975, Ser. No. 564,411

Int. Cl.² B32B *31/06*; B26D *5/08*

U.S. Cl. 156—510 **9 Claims**

1. A pedagogic pulse thermal sealing apparatus comprising a sealing station and a trimming station, the sealing station including two jaws, at least one of the jaws including means adapted to provide a pulse heat output, the one jaw including a covering sheath, clamping means adapted to retain the sheath in position, the clamping means comprising a pair of angle plates, one face of each plate extending over an opppos-ite side of the one jaw and being biased against the sheath, the other face of the plates overlapping one another, the sealing station further including work piece alignment means, the trimming station including a manually actuatable cutting blade, and work piece clamping means, means biasing the



clamping means to a first position adapted to receive a work piece, the clamping means being movable to a second position securing the work piece for trimming, the clamping means being unrestrained from returning to its first position in the absence of constant manually applied force, whereby both hands of the operator are engaged during the trimming thus assuring safe operation.

4,010,064

CONTROLLING THE OXYGEN CONTENT OF CZOCHRALSKI PROCESS OF SILICON CRYSTALS BY SANDBLASTING SILICA VESSEL

William John Patrick, Poughkeepsie; Salvatore James Scilla, Marlboro, and Wolfgang Alfred Westdorp, Hopewell Junction, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 27, 1975, Ser. No. 581,307

Int. Cl.² B01J *17/18*; C01B *33/02*

U.S. Cl. 156—617 SP **2 Claims**

1. A process for increasing the oxygen content and reducing the oxygen concentration gradient through the length of a silicon crystal, which is drawn from a silicon melt contained in a silica vessel according to the Czochralski process, comprising: treating said vessel to change the characteristics of the silica surface which is in contact with said melt by roughening said surface by sandblasting until said surface becomes opaque, so as to provide a more uniform dissolution rate of said silica surface by said melt during the crystal growing process.

4,010,065

PROCESS AND APPARATUS FOR REGENERATING WET GLYCOLS

Carl E. Alleman, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Mar. 20, 1975, Ser. No. 560,393

Int. Cl.² B01D *1/16*, *1/00*, *53/02*; C07C *29/26*

U.S. Cl. 159—4 CC **9 Claims**

5. Apparatus for regenerating a wet, oxygen-containing glycol comprising

a. a source of oxygen-containing wet glycol;

b. a first stripping unit means for stripping oxygen from said wet oxygen-containing glycol maintained at a temperature of about 70° to 150° F;

c. a second stripping unit means for removing water from said wet glycol;

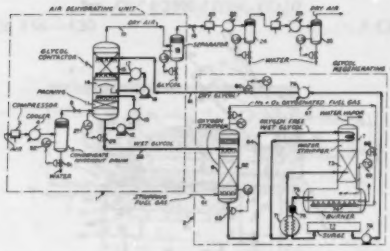
d. first conduit means connecting said source with an inlet of said first stripping unit for wet glycol;

e. a source means for a stripping gas selected from the group

consisting of hydrocarbon gases, fuel gases, inert gases and mixtures thereof;

f. a gas inlet means into said first stripping unit means connected to said source for a stripping gas;

g. a gas outlet means from said first stripping unit means;



h. second conduit means for connecting an outlet of said first stripping unit means for the wet glycol with an inlet of said second stripping unit means; and

i. third conduit means for withdrawing dry liquid glycol from said second stripping unit means.

4,010,066

METHOD FOR IMPROVING HEAT ECONOMY IN THE BATCHWISE DIGESTION OF LIGNOCELLULOSIC MATERIAL BY ADJUSTING THE LEVEL OF FREE DIGESTION LIQUOR

Ulf Torbjorn Olson, Moliden, and Erik Olof Sture Hagglund, Ornskoldsvik, both of Sweden, assignors to Mo och Domsjo, Ornskoldsvik, Sweden

Filed Oct. 17, 1974, Ser. No. 515,736

Claims priority, application Sweden, Oct. 17, 1973, 7314127

Int. Cl.² D21C *7/12*

U.S. Cl. 162—49 **8 Claims**

1. A process for the batchwise digestion of lignocellulosic material with improved heat economy, using free and absorbed digestion liquor in which the digestion chemicals are in solution in the liquor, comprising charging a batch of digestion liquor and a batch of particulate lignocellulosic material capable of absorbing digestion liquor under pressure to a predetermined level in a batch digester and forming therein a stationary bed of the lignocellulosic material having at least about 50% of the particulate material immersed in digestion liquor; applying a superatmospheric gas pressure in the digester above the level of the digestion liquor within the range from about 1 to about 15 bars above atmospheric pressure until the digestion liquor content of the particulate material has been brought to an equilibrium level at that pressure; determining the level of the digestion liquor after digestion liquor has been absorbed, and then adjusting the level of free digestion liquor in the digester to approximately that level providing an amount including the absorbed liquor sufficient to digest the lignocellulosic material; and then digesting the lignocellulosic material therewith at that pressure to form cellulose pulp.

4,010,067

PROCESS OF PREVENTING FORMATION OF RESINOUS DEPOSITS IN THE MANUFACTURE OF PAPER AND THE LIKE

Ernst Hoeger, Neuhofen, and Margarete Scholl, Mannheim, both of Germany, assignors to Benckiser-Knapsack GmbH, Ladenburg (Neckar), Germany

Filed Feb. 21, 1975, Ser. No. 551,684

Claims priority, application Germany, Jan. 3, 1975, 2500209

Int. Cl.² D21H *3/02*

U.S. Cl. 162—76 **10 Claims**

1. In a process of preventing formation of resinous deposits and overcoming pitch trouble from a resin-containing cellulosic starting material in the manufacture of paper, cardboard, boxboard, and the like, said process comprising adding to the resin-containing cellulosic starting material during processing an additive consisting essentially of a phosphonic acid or an alkali metal salt thereof and orthophosphoric acid or an alkali metal salt thereof, said additive being added in an amount between about 0.02% and about 1.0%, calculated for dry cellulosic material in said starting material, and said phosphonic acid component and said orthophosphoric acid component being present in a ratio of from about 1:10 to 10:1.

4,010,068

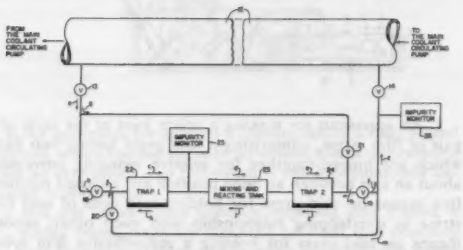
REMOVAL OF RADIOACTIVE CONTAMINATION FROM A NUCLEAR REACTOR COOLANT

Martin H. Cooper, Monroeville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 293,238, Sept. 28, 1972, now Defensive Publication No. T921,016. This application Mar. 3, 1975, Ser. No. 554,786

Int. Cl.² G21C *19/32*

U.S. Cl. 176—37 **12 Claims**



1. A method for removing fission products from a coolant of a nuclear reactor system by use of a flow loop connected to said reactor system, said flow loop including a pair of vessels in series, each vessel having means for cooling reactor coolant flowing therethrough to form a cold trap, and means for reversing the direction of flow through said pair of vessels, said method comprising the steps of:

diverting a portion of said coolant flowing through said reactor system,

adding reactant to said diverted coolant,

said reactant serving to enhance removal of fission products from said diverted coolant,

flowing said diverted coolant in one direction through said vessels in series, with the temperature of said diverted coolant being substantially maintained on flowing through the first of said vessels, and said diverted coolant being cooled on flowing through the second of said vessels to precipitate said fission products and excess reactant,

returning said diverted coolant to said reactor system,

then, when the supply of said reactant is substantially exhausted, flowing diverted coolant in an opposite direction through said vessels, substantially maintaining the tem-

perature of said diverted coolant flowing through said second vessel to dissolve said precipitated fission products and excess reactant in said diverted coolant, and cooling said diverted coolant flowing through said first vessel to achieve further precipitation of fission products and optimal utilization of said reactant,

returning said diverted coolant to said reactor system.

4,010,069

NUCLEAR REACTOR FUEL ROD

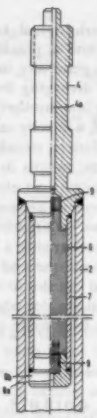
Wilfried Jung, Erlangen; Werner Kaden, Tennenlohe, and Peter Rau, Mittelehrenbach, all of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Continuation of Ser. No. 326,467, Jan. 24, 1973, abandoned. This application May 5, 1975, Ser. No. 574,691

Claims priority, application Germany, Jan. 26, 1972, 2203518

Int. Cl.² G21C *3/02*

U.S. Cl. 176—68 **1 Claim**



1. A vented nuclear fuel rod comprising a tubular casing having upper and lower ends and which is integral throughout between said ends, a lower end cap closing said lower end, said upper end having an upper end cap having a substantially central, axially extending hole formed therethrough and a flange which is welded to said upper end, said casing having an inside and said upper end cap having a tubular stub projecting into said casing and radially spaced from said inside, a tubular filter casing inside of the first-named casing and having an upper end which is welded to said tubular stub, said filter casing having a lower end and a filter end cap welded thereto and through which a hole extends axially, said filter casing having an inside in which filter material is pressed to a degree preventing gas by-passing between the material and the inside of the filter casing, and nuclear fuel positioned within the first-named casing's said inside between said filter end cap and said lower end cap of the first-named casing.

4,010,070

ABSORBER ELEMENT FOR PEBBLE-BED REACTORS

Günter Lohnert, and Ulrich Müller-Frank, both of Bensberg, Germany, assignors to Interatom, Internationale Atomreaktorbau GmbH, Bensberg, Cologne, Germany

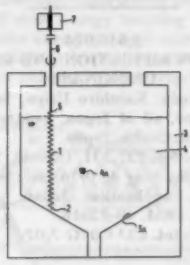
Filed Mar. 13, 1975, Ser. No. 558,131

Claims priority, application Germany, Mar. 16, 1974, 2412775

Int. Cl.² G21C *7/10*

U.S. Cl. 176—86 R **2 Claims**

1. A pebble-bed reactor comprising a reactor container, fuel pebbles having a characteristic cross-sectional size and forming a reactor pebble bed in said container, and at least one absorber element comprising a rod having an outside diameter substantially the same as said characteristic cross-sectional size of said fuel pebbles, said rod having the shape of a hollow helix-like spiral forming a single thread terminating



with a leading tip, said element being substantially vertically positioned so that by applying torque to said element said rod is screwed into said pebble bed like being screwed into a thread with the rod's said tip having a direction of penetration into said pebble bed which deviates from a vertical direction.

4,010,071

CLARIFICATION OF XANTHAN GUM

George T. Colegrove, San Diego, Calif., assignor to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 513,810, Oct. 10, 1974, Pat. No. 3,966,618, which is a continuation-in-part of Ser. No. 449,875, March 11, 1974, abandoned. This application Dec. 17, 1975, Ser. No. 641,452

Int. Cl.² C12D *13/04*

U.S. Cl. 195—7 **16 Claims**

1. The method of clarifying an aqueous solution of xanthan gum containing water-insoluble fermentation solids that comprises contacting said solution with an alkaline protease enzyme.

4,010,072

PROCESS FOR PREPARING L-TARTARIC ACID

Yuichi Miura, Tokuyama; Kiyohiko Yutani, Kudamatsu, and Yusuke Izumi, Shinnanyo, all of Japan, assignors to Tokuyama Soda Kabushiki Kaisha, Japan

Filed Feb. 5, 1976, Ser. No. 655,422

Claims priority, application Japan, Feb. 14, 1975, 50-17973

Int. Cl.² C12D *1/02*

U.S. Cl. 195—30 **15 Claims**

1. Cis-epoxysuccinate hydrolase obtained from *Nocardia tartaricans* characterized by (1) a molecular weight of from 60,000 to 95,000, (2) an optimum pH as illustrated in FIG. 2, (3) an optimum temperature as illustrated in FIG. 3, (4) a pH stability as illustrated in FIG. 4, and (5) a temperature stability as illustrated in FIG. 5.

4,010,073

FREE-FLOWING ENZYME COMPOSITION

Billy B. Drake, Philadelphia, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Filed June 25, 1975, Ser. No. 590,238

Int. Cl.² C12K *1/00*

U.S. Cl. 195—64 **10 Claims**

1. A process for preparing a stabilized fungal α-amylase composition suitable for use in the baking industry, which comprises uniformly blending a liquid fungal α-amylase con-

centrate having a minimum diastatic activity of 12,500 SKB units with a sufficient amount of a dried starch containing a maximum of 3% moisture to obtain a free-flowing fungal α-amylase composition having a diastatic activity of at least 1,000 SKB units/gram thereby obtaining maximum water content of 8.4%.

4,010,074

METHOD FOR PURIFICATION AND RECOVERY OF UROKINASE

Yahiro Uemura, Ikeda; Katuhiro Uriyu, Sakai, and Satoshi Funakoshi, Katano, all of Japan, assignors to The Green Cross Corporation, Osaka, Japan

Continuation of Ser. No. 537,331, Dec. 30, 1974, abandoned. This application May 4, 1976, Ser. No. 683,239
Claims priority, application Japan, Jan. 22, 1974, 49-10022; Jan. 28, 1974, 49-12016
Int. Cl.² C07G 7/02
U.S. Cl. 195—66 B **14 Claims**

1. A method for the purification and concentration of urokinase which comprises selectively adsorbing urokinase from an impurity-containing aqueous urokinase solution at a pH ranging from about 4.0 to about 6.0 on a water-insoluble polysaccharide selected from the group consisting of agar and agarose, and thereafter eluting the adsorbed urokinase with an aqueous alkaline solution or a concentrated aqueous salt solution.

4,010,075

PROCESS FOR PRODUCING 4-THIOURACIL

John H. Coats; Alma Dietz, both of Kalamazoo; Lester A. Dolak, Plainwell; Oldrich K. Sebek, and Walter T. Sokolski, both of Kalamazoo, all of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Filed May 24, 1976, Ser. No. 689,376
Int. Cl.² C12D 9/00
U.S. Cl. 195—80 R **8 Claims**

1. A process for preparing 4-thiouracil which comprises cultivating *Streptomyces libani* subsp. *soldani*, having the identifying characteristics of NRRL 8173 in an aqueous nutrient medium under aerobic conditions until substantial antibiotic activity is imparted to said medium.

4,010,076

REACTOR FOR STABILIZED MICROBES HAVING PHOTOMETABOLIC ACTIVITY

Howard H. Weetall, Big Flats, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed Apr. 1, 1976, Ser. No. 672,631
Int. Cl.² C12B 1/00
U.S. Cl. 195—115 **13 Claims**

1. A method for the continuous photometabolic production of a useful product which comprises the steps of immobilizing whole cells of a photometabolically active organism on a medium to form a stabilized composite, supportably placing the composite within a reactor having at least one light transmitting wall, and, in the presence of light being transmitted through the wall, continuously passing into the reactor a substance capable of being photometabolized by the cells under conditions sufficient to assure the production of the useful product.

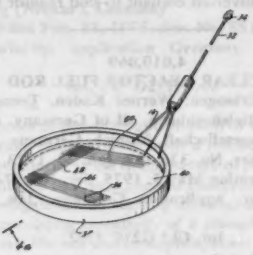
9. A reactor for the continuous photometabolic production of a useful substance comprising, in combination, a hollow body having at least one light transmitting wall and an inner chamber, inlet and outlet passageways in communication with the inner chamber and the environment external to the body, and, disposed within said chamber and, in communication with said inlet and outlet passageways, a support means supporting an immobilized, photometabolically active microbe system, said system disposed in a position to receive light transmitted through the light transmitting wall.

4,010,077

BACTERIOLOGICAL TRANSFER LOOP

George Pardos, Whalers Point, East Haven, Conn. 06512

Filed Feb. 24, 1975, Ser. No. 552,213
Int. Cl.² C12B 1/02
U.S. Cl. 195—127 **8 Claims**



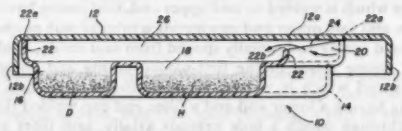
1. A disposable bacteriological transfer and inoculating loop comprising a base and a plurality of circumferentially spaced fingers extending generally in a common axial direction from said base and diverging from one another to free ends spaced further from one another than the portions of the fingers adjacent said base, whereby said fingers are adapted to be used successively to plate or streak a bacteriological specimen on a growth medium; means in said base opposite said fingers for removably securing an elongated rod to said base whereby said rod may serve as a manipulating handle for said loop; said rod having an enlargement formed at one end thereof and said means comprising a keyhole type slot in said base adapted to receive said one end of said rod and a recess formed in the base behind the slot to receive said enlargement when the rod is inserted in the slot whereby rotation of the rod in said slot will cause the base to be positively secured to said one end of the rod.

4,010,078

DEVICE FOR USE IN THE IDENTIFICATION OF MICROORGANISMS

Welton I. Taylor, 7621 S. Prairie, Chicago, Ill. 60619

Filed Feb. 23, 1976, Ser. No. 660,480
Int. Cl.² C12K 1/10
U.S. Cl. 195—139 **8 Claims**



1. A device for use in the identification of microorganisms, comprising: a microorganism culture medium receiving portion having a plurality of culture medium receiving compartments formed therein, and a cover for the culture medium receiving portion having a top wall and a depending side wall, said culture medium receiving portion having an outer, upwardly extending side wall the upper margin of which engages and maintains the top wall of the cover in spaced apart relation to the upper surface of a microorganism culture medium contained in the compartments of the culture medium receiving portion, said culture medium receiving portion side wall having a section which extends inwardly along the horizontal plane of the culture medium receiving portion toward the center thereof to provide a culture medium orienting recess in the culture medium receiving portion between at least two of the compartments formed therein, said inwardly extending section of the side wall being of reduced height in relation to the remainder of the side wall along its inward extension

toward the center of the culture medium receiving portion to provide, in cooperation with the cover, a covered air-passageway at said recess in communication with the space between the upper surface of the compartments formed in the culture medium receiving portion and the top wall of the cover for enabling an atmosphere which favors the growth of microorganisms to be selectively established over the culture medium in the compartments of the culture medium receiving portion while the culture medium is shielded from culture medium contaminants by the cover.

4,010,079

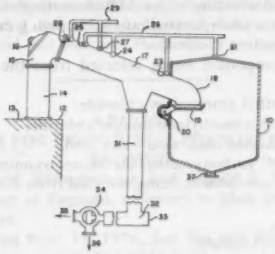
COKE OVEN CHARGING GAS CLEANING AND COLLECTING APPARATUS AND PROCESS

Paul V. Faber, Morristown, N.J., assignor to Wilputte Corporation, Murray Hill, N.J.

Continuation-in-part of Ser. No. 392,873, Aug. 30, 1973, abandoned. This application Feb. 19, 1975, Ser. No. 551,020

Int. Cl.² C10B *27/04, 27/06*

U.S. Cl. 201—4 **7 Claims**



1. In a by-product coke oven battery comprising a plurality of coke ovens, a coking gas collecting main, a standpipe opening out of the top of each oven and comprising a vertical portion, a laterally extending portion and a terminal portion discharging through first liquor seal valve means into the coking gas collecting main, and means for introducing flushing liquor into the gas in the standpipe, the improvement comprising means for injecting charging liquor separate from the flushing liquor into the gases in the standpipe, an offtake pipe for liquor and solid particles only separate from the coking gas collecting main opening downwardly out of the laterally extending portion of the standpipe upstream of and adjacent the terminal portion thereof, and downstream of the means for injecting charging liquor and second valve means in the offtake pipe discharging into a charging liquor collecting main.

6. In the treatment of gases from coke ovens including the steps of spraying the coking gas with flushing liquor and spraying the charging gas with charging liquor, the improvement comprising passing charging gas and coking gas sequentially along a common path into a common collecting main, spraying the coking gas in that path with flushing liquor, spraying the charging gas in that path with charging liquor so as to scrub solid particles therefrom, drawing off charging liquor and solid particles from the charging gas in that path into a single stream before the charging gas enters the common collecting main, and drawing off flushing liquor from the coking gas in that common collecting main.

4,010,080

SOLAR POWERED DISTILLING DEVICE

Yaw Jenn Tsay, and Kuo-Chuan Lin, both of No. 10, Lane 177, Pei Hsing Street, Chia I, Taiwan, China /Taiwan

Filed Mar. 3, 1976, Ser. No. 663,633

Int. Cl.² C02B *1/06, 1/08*

U.S. Cl. 202—83 **16 Claims**

1. A distilling device powered by solar energy comprising:

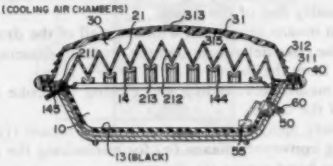
a housing for defining a vaporization chamber;

a transparent cover on said housing;

a transparent condensation plate mounted on said housing to define a pair of separated chambers including a cooling air chamber defined by one side of said plate and said cover, said vaporization chamber being defined by the other side of said plate and said housing;

fluid inlet means on said housing for conducting fluid to be vaporized into said vaporization chamber;

a plurality of solar energy focusing lenses on said cover focusing solar energy through said cooling air chamber and said condensation plate onto the fluid located in said vaporization chamber to form vapor;



air inlet means on said cover for conducting cooling air into said cooling air chamber to contact said condensation plate one side for maintaining said plate at a temperature below the condensation temperature of the fluid in said vaporization chamber so that vapor formed in said vaporization chamber is condensed into condensate upon contact with said plate other side;

a condensate collecting means connected to said housing for collecting for condensate formed on said condensation plate; and

outlet means connected to said condensate collecting means for withdrawing the collected condensate from said housing.

4,010,081

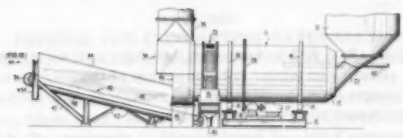
APPARATUS FOR QUENCHING AND COOLING COKE

Judson W. Martt, Amsterdam, Ohio, assignor to National Steel Corporation, Pittsburgh, Pa.

Filed Mar. 14, 1975, Ser. No. 558,353

Int. Cl.² C10B *39/04, 39/10, 39/12*

U.S. Cl. 202—228 **13 Claims**



1. Apparatus for quenching and cooling coke comprising

a. a rotary drum for receiving hot coke having a cylindrical interior wall, a coke entry end and a coke discharge end,

b. means for supporting the drum for rotation about a substantially horizontal axis coinciding with the axis of symmetry of the drum,

c. a stationary coke restraining means having lower marginal portions disposed in closely spaced relation to the lower portion of the interior wall of the drum at the coke entry end of the drum to prevent escape of entering coke, the spacing between the coke restraining means and the upper portion of the interior wall of the drum at the entry end of the drum being greater for ingress of sweeping air into the drum,

d. hot coke feeding spout means having a coke delivery portion positioned to feed hot coke into the coke entry end of the drum at the lowermost portion of the drum,

e. conveyor means at the coke delivery end of the drum for conveying cooled coke away from the drum,

f. rigid helical vane means having an inner free edge and an

outer edge contiguous to and fixed relative to the interior surface of the drum and extending from the coke entry end of the drum to the coke delivery end of the drum, the axis of symmetry of the helix coinciding with the axis of symmetry of the drum, (1) the diameter and length of the drum, (2) the depth dimension of the vane means and (3) the pitch of the helix all being such as to convey a predetermined amount of coke from the coke entry end of the drum to the coke delivery end of the drum in the time period required to quench and cool the coke with the drum rotating at a speed which will not cause undue attrition of the coke,

g. spray means for spraying water on the coke adjacent the coke entry end of the drum,

h. screen means associated with the wall of the drum adjacent the coke delivery end of the drum for draining excess water from the drum,

i. hood means surrounding and closing the coke delivery end of the drum,

j. enclosure means associated with hood means (i) for enclosing conveyors means (e) for minimizing the entry of air into hood means (i) at conveyor means (e), and

k. exhaust means associated with hood means (i) for exhausting steam from the drum.

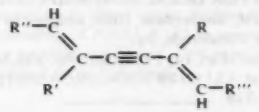
4,010,082

DIVINYLACETYLENES AS POLYMERIZATION INHIBITORS FOR ACRYLIC AND METHACRYLIC ACID

Joseph W. Nemec, Rydal, and Thomas Stewart, Andalusia, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Filed Aug. 21, 1975, Ser. No. 606,627
Int. Cl.² C07C 57/04; B01D 3/34
U.S. Cl. 203—8 **6 Claims**

1. A method for inhibiting the polymerization of acrylic and methacrylic acid at ambient or above ambient temperatures, said method comprising contacting said acid with a polymerization inhibiting compound having the formula:



where

R, R′, R″, R‴ is hydrogen, alkyl or aryl, in an amount effective to inhibit polymerization of the acid during the preparation, purification or storage of said acid under substantially anaerobic conditions.

4,010,083

METHOD OF LOCAL ELECTROPLATING OF STRIP MATERIAL

Martinus Antonius Maria Bakker, and Leonardus Henricus Klerks, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed May 28, 1975, Ser. No. 581,576
Int. Cl.² C25D 5/02, 5/06
U.S. Cl. 204—15 **1 Claim**

1. A method of electroplating selected portions of a strip material, comprising bringing the desired portions of the strip material, connected as a cathode, in contact only with an electroplating solution present on the surface of a rotating cylinder, the surface at least of which is electrically non-conducting, while moving said strip material along the axis of said cylinder and while said rotating cylinder is partially immersed in a tank containing the electroplating solution and an anode separated from said cylinder, in a manner such that the axis of said cylinder is substantially parallel to the surface of the electroplating solution in the tank.

4,010,084

METHOD OF AND ELECTROLYTIC BATH FOR THE ELECTRODEPOSITION OF SEMIBRIGHT NICKEL AND NICKEL-COBALT COATINGS UPON A METAL SURFACE

Robert Brugger, Bernhausen; Martin Kohl, Dusseldorf, and Horst Krause, Neuss, all of Germany, assignors to Langbein-Pfanhauser Werke AG, Neuss, Germany

Continuation of Ser. No. 475,264, May 31, 1974, abandoned. This application Oct. 23, 1975, Ser. No. 625,095
Claims priority, application Germany, June 1, 1973, 2327881
Int. Cl.² C25D 3/12, 3/16, 3/18, 3/56
U.S. Cl. 204—43 T **9 Claims**

1. A process for producing a semibright nickel-containing coating upon a metal surface comprising the steps of:

electrodepositing said coating upon a substrate from an aqueous electroplating bath; and

forming in situ within said bath a mat-finish-producing substance by introducing into said bath an effective amount of a cationic or amphoteric surface-active first component and a second component yielding organic anions interacting with said first component to produce a flocculate incorporated into said coating during the electrodeposition thereof,

said first component being selected from the group which consists of:

cetyltrimethyl ammonium chloride,

coconut oil trimethylammonium chloride,

triethanolamine oleic acid ester, and

N-lauryl-N″carboxymethyl-diethylenetriamine;

said second component being selected from the group which consists of:

saccharin,

2-ethylhexyl sulfate,

lauryl-ethylene oxide-ether sulfate,

2-propene sulfonic acid;

said bath containing substantially:

200 to 450 g/liter nickel sulfate,

40 to 65 g/liter nickel chloride, and

30 to 50 g/liter boric acid and

the pH is about 4, the temperature is about 55° C and the current density is about 5 A/dm².

6. In a bath for electroplating nickel or nickel-cobalt upon a metal substrate, the improvement which comprises an effective amount of a first component and a second component in said bath reactive to form a flocculate incorporated in the coating upon electrodeposition thereof,

said first component being selected from the group which consists of:

cetyltrimethyl ammonium chloride,

coconut oil trimethyl ammonium chloride,

triethanolamine oleic acid ester, and

N-lauryl-N″carboxymethyl-diethylenetriamine; said second component being selected from the group which consists of:

saccharin,

2-ethylhexyl sulfate,

lauryl-ethylene oxide-ether sulfate, and

2-propeneslfonic acid.

4,010,085

CATHODE ELECTROCATALYST

William W. Carlin, Portland, Tex., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Apr. 28, 1976, Ser. No. 681,014
Int. Cl.² C25B 1/26, 1/04, 11/06
U.S. Cl. 204—128 **8 Claims**

1. In a method of electrolyzing an aqueous alkali metal chloride which method comprises passing an electrical current from an anode to a cathode, evolving chloride at said anode and evolving hydrogen at said cathode at a hydrogen evolution potential, the improvement wherein said cathode has a coating thereon comprising tungsten and a transition metal chosen

from the group consisting of nickel, cobalt, and mixtures thereof.

4,010,086

ELECTROCLEANING METHOD AND COMPOSITION

Leo Donald Barrett, Cleveland Heights, and Irwin Herbert Schram, Lyndhurst, both of Ohio, assignors to Man-Gill Chemical Company, Cleveland, Ohio

Filed Feb. 20, 1976, Ser. No. 659,672
Int. Cl.² C25F *1/06, 1/02*
U.S. Cl. 204—141.5 **22 Claims**

1. In the method of electrocleaning a metallic article by positioning said article in an aqueous bath and passing electrical current through said article, the improvement which comprises:

providing an aqueous bath having dissolved therein, (a) alkali metal hydroxide in an amount sufficient to impart electric conductivity to said bath and (b) an effective amount of a cleaning agent selected from the group consisting of 1-hydroxyethylidene-1, 1-diphosphonic acid, an alkali metal salt of 1-hydroxyethylidene-1, 1-diphosphonic acid and mixtures thereof.

4,010,087

PROCESS FOR PREPARING 3-PHENOXYBENZYL BROMIDE

Derek A. Wood, Sittingbourne, and Ronald F. Mason, near Ashford, both of England, assignors to Shell Oil Company, Houston, Tex.

Filed Mar. 11, 1976, Ser. No. 665,991
Int. Cl.² B01J *1/10*
U.S. Cl. 204—158 HA **2 Claims**

1. A process for preparing 3-phenoxybenzyl bromide, which comprises treating 3-phenoxytoluene with bromine in the presence of ultra-violet radiation, at a temperature within the range of 180° C to 250° C.

4,010,088

PROCESS FOR PREPARING HIGHLY-CURED TRANSPARENT RESIN MOLDED PRODUCTS

Hiroshi Okubo; Masamichi Kato, and Akihiko Ito, all of Takasaki, Japan, assignors to Japan Atomic Energy Research Institute, Tokyo, Japan

Continuation-in-part of Ser. No. 413,870, Nov. 8, 1973, abandoned. This application June 11, 1975, Ser. No. 586,026
Claims priority, application Japan, Nov. 14, 1972, 47-113499
Int. Cl.² C08F *2/46*
U.S. Cl. 204—159.24 **9 Claims**

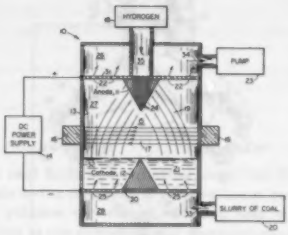
1. A process for the production of a highly-cured transparent resin formed product, which comprises (1) incorporating a ring-opening and cross-linking catalyst in the initial monomer composition comprising (a) from about 1% to 100% by weight of a glycidyl ester selected from the group consisting of glycidyl methacrylate, glycidyl acrylate and a mixture thereof and (b) from 0% to about 99% by weight of one or more other vinyl monomers at temperatures within the range of from about −50° C to room temperature, followed by vinyl-polymerizing the initial monomer composition thus prepared in a mold into a vinyl polymer at 90% or more conversion by irradiating said composition with an ionizing radiation at temperatures within the range of from about −50° C to room temperature so as not to activate said ring-opening and cross-linking catalyst, (2) remolding the thus obtained vinyl polymer having thermoplasticity into the desired shape and (3) heating the molded product at a temperature of from about 50° C to about 200° C for several minutes to tens of hours to highly-cure the molded polymer product by the introduction of cross-linking.

4,010,089

REACTING COAL

William R. Stowell, and Joseph R. Sagmuller, both of Columbus, Ohio, assignors to Battelle Memorial Institute, Columbus, Ohio

Filed June 7, 1974, Ser. No. 477,256
Int. Cl.² B01K *1/00*; C07C *3/24*; C10G *1/00*
U.S. Cl. 204—168 **9 Claims**



1. A method of reacting coal with hydrogen to provide hydrocarbon products that comprises

providing an anode and a cathode spaced therefrom in a container,

applying to the anode an electric potential substantially more positive than the potential at the cathode to provide an electric arc in a reaction zone between the anode and the cathode comprising hydrogen at subatmospheric pressure and thus to maintain a plasma therein,

providing a magnetic field of at least about **100** gauss approximately perpendicular to the arc,

directing hydrogen into contact with the anode and from there into the reaction zone to ionize a substantial portion of the hydrogen positively,

directing coal into contact with the cathode and from there into the reaction zone to charge a substantial portion of the coal negatively,

reacting the materials as ionized whereby the free energy decrease for each reaction at a given temperature is greater than that for molecular hydrogen, and

withdrawing the hydrocarbon products from the reaction zone.

4,010,090

PROCESS FOR CONVERTING NATURALLY OCCURRING HYDROCARBON FUELS INTO GASEOUS PRODUCTS BY AN ARC HEATER

Maurice G. Fey, Plum Borough, Pa.; George A. Kemeny, Sudbury, Mass., and Frederick A. Azinger, Jr., Churchill Borough, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 11, 1975, Ser. No. 603,576
Int. Cl.² B01K *1/00*; C07C *3/00, 5/00, 11/22*
U.S. Cl. 204—170 **9 Claims**

1. In a process for converting naturally occurring hydrocarbon fuels into a gaseous product comprising the steps of:

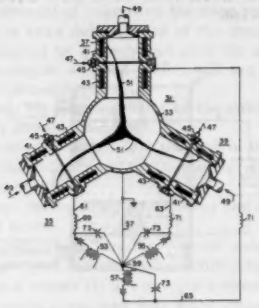
providing a poly-phase arc heater system characterized by a number of arc heaters having arc chambers communicating with a central housing chamber;

striking an electric arc in an axial gap between generally hollow, cylindrical electrodes spaced along a common axis that form the arc chamber in each of the intercommunicating arc heater chambers, the arc being maintained at a temperature for at least a portion of its life sufficient to produce free hydrocarbon radical ions from hydrocarbon fuel;

introducing a hydrocarbon gas selected from the group consisting of ethane, methane, propane, butane, and mixtures thereof, through the gap in a direction generally transverse to the axis to thereby elongate the arc to produce a temperature therein sufficiently high to produce

the free hydrocarbon radical ions from the hydrocarbon gas and to cause the arc in each arc heater to flash through the central housing chamber and into another arc heater;

feeding into one end of the central housing chamber natu-



rally occurring coal or oil through the arc chamber and into the region of the free hydrocarbon radical ions to thereby chemically react with the free radical ions to produce a stream of gaseous hydrocarbon fuel; and

withdrawing the stream of gaseous hydrocarbon fuel from an exhaust port at the other end of the arc chamber.

4,010,091

NOVEL ELECTRODE FOR ELECTROLYSIS CELL

Dominique Ravier, Paris, and Pierre Bouy, Enghien-les-Bains, both of France, assignors to Rhone-Poulenc Industries, Paris, France

Filed May 12, 1976, Ser. No. 685,691

Claims priority, application France, May 30, 1975, 75.16966

Int. Cl.² C25B *11/08, 11/10*

U.S. Cl. 204—290 F **10 Claims**

1. A novel electrode suitable for use in cells for electrolysis characterized in that it comprises at least one compound of perovskite structure of the general formula:

$$(M_{1-x}M'_x)\,Co\,O_3$$

wherein M is an ion of a metal from the group comprising yttrium and lanthanides, M′ is an ion of a metal chosen from the group comprising ruthenium, rhenium, osmium, iridium, platinum, lead and palladium, and x is a number less than 1.

4,010,092

OIL SHALE RETORTING-GASIFICATION PROCESS

Roland F. Deering, Brea, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Filed May 10, 1974, Ser. No. 468,927

Int. Cl.² C10G *1/02*

U.S. Cl. 208—11 R **6 Claims**

1. In a process for producing shale oil and a hydrogen-containing product gas, wherein a stream of raw crushed shale is first countercurrently contacted in an eduction zone with a stream of essentially oxygen-free, hot eduction gas to thereby produce shale oil, an eduction off-gas and hot, essentially oil-free, coke-containing spent shale, and wherein said hot spent shale is thereafter countercurrently contacted in a gasification zone with a conversion gas mixture comprising steam and oxygen to partially combust the coke on said spent shale and thereby heat said spent shale to sufficiently high peak temperatures, between about 1200° and 1800° F, to react said stream with remaining coke, thereby producing an essentially oxygen-free, hydrogen-containing water gas, and wherein said eduction gas comprises a mixture of water gas and a recycle portion of said eduction off-gas, the improvements which comprise:

1. passing said raw shale upwardly through said eduction zone, and said spent shale downwardly through said gasification zone;
2. maintaining an essentially oxygen-free transition zone between said eduction zone and said gasification zone;
3. passing said spent shale through said transition zone into said gasification zone;
4. passing a first portion of said water gas through said transition zone into said eduction zone;
5. contacting a second portion of said water gas, comprising about 20–50% of the total thereof, with liquid water in a steam generation zone to effect simultaneous cooling and steam-enrichment thereof;
6. recycling the steam-enriched water gas from step (5) through said gasification zone;
7. injecting said recycle portion of eduction off-gas into said transition zone to mingle therein with said first portion of water gas and form said eduction gas; and
8. withdrawing the non-recycled portion of said eduction off-gas as said hydrogen-containing product gas, none of said eduction off-gas being recycled through said gasification zone.

4,010,093

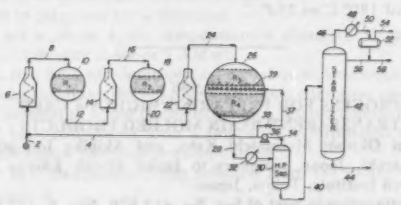
METHOD OF OPERATING A PLATINUM REFORMER COMPRISING A SELECTIVE ZEOLITE CATALYST IN THIRD REACTOR

John Maziuk, Yardley, Pa., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation of Ser. No. 338,465, March 6, 1973, abandoned. This application Feb. 4, 1975, Ser. No. 547,070

Int. Cl.² C10G *39/00*

U.S. Cl. 208—65 **9 Claims**



1. In a processing combination comprising a bed of crystalline zeolite conversion catalyst downstream of a plurality of separate sequentially arranged beds of naphtha reforming catalyst, the method for altering the product distribution obtained from the combination processing naphtha boiling material in the presence of hydrogen rich gas which comprises:

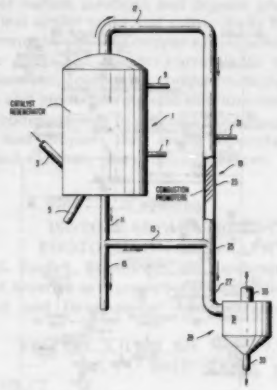
promoting the formation of gasoline boiling range material of higher octane rating than the naphtha charged to the combination process by operating the catalytic reforming portion under reduced recycled hydrogen partial pressure to promote dehydrogenation and the formation of gasoline boiling products in combination with relying upon a major portion of recycle hydrogen rich gas as quench fluid to reduce the temperature of the effluent obtained from catalytic reforming below about 650° F. before contacting the zeolite conversion catalyst and

promoting the formation of LPG and aromatic rich concentrates with the catalytic combination by raising the hydrogen partial pressure of the catalytic reforming operation with hydrogen rich recycle gas sufficient to promote hydrocracking during reforming in combination with reducing the hydrogen gas quench fluid to raise the temperature of the effluent of reforming to at least 650° F.

4,010,094
COMBUSTING FLUE GAS IN A CRACKING CATALYST REGENERATION PROCESS

Claude O. McKinney, Munster, Ind., assignor to Standard Oil Company, Chicago, Ill.

Continuation of Ser. No. 451,140, March 14, 1974, abandoned. This application May 9, 1975, Ser. No. 576,122
Int. Cl.² C10G *11/18*
U.S. Cl. 208—164 **15 Claims**



1. A hydrocarbon catalytic cracking process, including hydrocarbon cracking and catalyst regeneration, comprising:

regenerating fluidized hydrocarbon cracking catalyst particles, which have been deactivated with coke deposits while employed in said hydrocarbon cracking, in a catalyst regenerator at regeneration temperature by contact with an oxygen-containing gas stream to combust coke on the catalyst and produce a carbon monoxide-containing flue gas,

passing said carbon monoxide-containing flue gas from the catalyst regenerator,

oxidizing said carbon monoxide-containing flue gas from the catalyst regenerator to substantially completely combust carbon monoxide contained therein to form a combusted effluent of reduced carbon monoxide content,

withdrawing catalyst from the catalyst regenerator separately from said carbon monoxide-containing flue gas,

passing said withdrawn catalyst, which is relatively free of carbonaceous material, in heat exchange relation with said combusted effluent to transfer heat generated from the carbon monoxide combustion to said cracking catalyst particles, and

conveying the resulting heated catalyst particles to said catalytic cracking process.

4,010,095
HYDRODYNAMIC METHOD FOR SEPARATION OF SOLID BODIES OR CRYSTALS

Joseph O. Hirschfelder; Edwin N. Lightfoot, both of Madison, Wis., and David W. Howard, Aiken, S.C., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.

Filed Aug. 1, 1974, Ser. No. 493,760
Int. Cl.² B03B *5/00*
U.S. Cl. 209—132 **8 Claims**

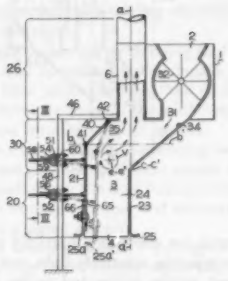
1. A method of employing hydrodynamic principles for separating solid bodies, at least one of which does not possess a center of hydrodynamic resistance and which have a number of faces, subjecting said solid bodies, while immersed in a viscous fluid of different specific gravity than that of the solid bodies, to gravitationally influence relative linear movement between said bodies and fluid, supporting said bodies on a non-horizontal surface for maintaining said bodies in a common face relation with respect to each other and to said surface in such a manner that they do not twist, during such relative movement establishing in response to such relative movement between the solid bodies and fluid a resultant force

that acts on said bodies in the same plane but in a direction perpendicular to the direction of relative linear movement and that causes relative movement between said bodies in the same plane but in the perpendicular direction to cause separation.

4,010,096
PNEUMATIC CLASSIFIER FOR REFUSE MATERIAL WITH ADJUSTABLE AIR INTAKE

Donald L. Murray, Greenfield; John N. Lees, Jr., Wauwatosa, and Frank W. Toman, Jr., Milwaukee, all of Wis., assignors to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Oct. 9, 1975, Ser. No. 621,225
Int. Cl.² B07B *4/02, 11/04*
U.S. Cl. 209—139 R **2 Claims**



1. An apparatus for classifying particles of refuse material and the like to separate relatively light and heavy solid particles and having a column, means connected to the upper end of the column for drawing a stream of air into the lower end of the column and upwardly through the column, a chute that opens into the column intermediate the column ends for admitting mixed light and heavy solid particles, the column beneath the discharge end of the chute having vertical walls defining an air intake zone rectangular in horizontal cross-section and with at least the vertical wall of the air intake zone opposite the chute being movable and pivotally connected along a horizontal upper edge to a lower edge of an incline member which is in turn pivotally supported by the column along an upper horizontal edge so that the movable wall can move toward and away from the opposite wall of the air intake zone with the movable wall remaining vertical, and including an improvement which comprises:

a. the chute having an air lock feeder and a downwardly inclined material feeding chute from the feeder to a midportion of the column where the chute opens into the column and cooperates with the column to define a zone of expanded volume having a horizontal cross-sectional area greater than the cross-sectional area of the column above and below the expanded zone, the vertical walls

which define the air intake zone are arranged with one of such vertical walls opposite the movable wall intersecting with the material feeding surface of the chute along a horizontal axis of intersection, and with such one wall being in vertical alignment with a vertical center line through a portion of the column above the expanded zone, to thereby define for upwardly ascending air and particles a tortuous path with a turn toward the material feeding surface of the chute; and

b. adjustable support means connected to the movable wall and adapted to position the movable wall to in turn position the inclined member with its inner surface facing both downwardly and toward the chute, whereby a movement of the movable wall toward or away from the chute adjusts the angle of the inclined member beneath which air and particles moving upwardly are turned toward the chute in the course of following said tortuous path.

4,010,097

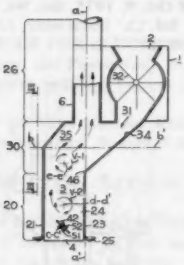
PNEUMATIC CLASSIFIER FOR REFUSE MATERIAL WITH DOUBLE VORTEX AIRFLOW

Donald L. Murray, Greenfield; John N. Lees, Jr., Wauwatosa, and Frank W. Toman, Jr., Milwaukee, all of Wis., assignors to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Oct. 9, 1975, Ser. No. 621,226

Int. Cl.² B07B *4/02, 11/04*

U.S. Cl. 209—139 R **6 Claims**



1. An apparatus for classifying particles of refuse material and the like to separate relatively light and heavy solids and having a column, means connected to the upper end of the column for drawing a stream of air into the lower end of the column and upwardly through the column, a chute that opens into the column intermediate the column ends and having an air lock feeder with a downwardly inclined material feeding surface from the air lock feeder to the column for admitting mixed light and heavy solids particles, the chute cooperating with the column to define a zone of expanded column volume and in which air drawn upwardly turns toward the chute and forms a vortex before resuming upward flow and including an improvement which comprises:

a. a baffle pivotally journalled in the lower end of the column below an intersection of the feed chute and the column, about a journal axis disposed in a generally horizontal plane; and

b. An actuating mechanism connected to the baffle and operative to pivot the airfoil about the general horizontal journal axis, whereby air drawn upwardly through the column from the lower end and passing upwardly over the baffle, turns to form a second vortex beneath the first vortex and pivoting the baffle about its journal axis provides a control of turbulence created by the second vortex and the separation characteristics of material introduced through the chute which result in heavier particles dropping from the column while lighter particles are carried upwardly in the air stream.

4,010,098

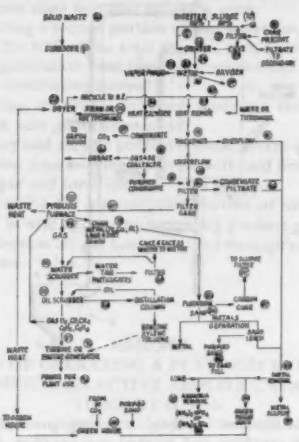
RESOURCE RECOVERY FROM DISPOSAL OF SOLID WASTE AND SEWAGE SLUDGE

Wayne Martin Fassell, Newport Beach, Calif., assignor to Barber-Colman Company, Rockford, Ill.

Filed May 29, 1975, Ser. No. 581,903

Int. Cl.² C02B *3/08*

U.S. Cl. 210—10 **23 Claims**



1. Resource recovery method for use in the treatment of collected sewage sludge dissolved or dispersed in aqueous medium and municipal solid waste comprising the combination of steps of subjecting at least a portion of the sewage sludge to exothermic wet oxidation by introduction of the aqueous medium into an enclosed space at a temperature within the range of 150°–450° C and pressure within the range of 300–3000 psi, said portion being in an amount to generate heat sufficient to substantially dry the solid waste and the remainder of the sewage sludge, introducing oxygen containing gas into the aqueous medium to cause oxidation of said sewage sludge contained in the aqueous medium until 10–95% reduction in COD is achieved, subjecting the wet oxidation reaction products to separation into a solid phase and a liquid phase, heating the solid waste and any remainder of said sewage sludge with heat derived from the exothermic wet oxidation of the sewage sludge, flowing a stream of molten lead in one direction from a head end to a foot end within a pyrolysis chamber, depositing the heated solid waste and remainder of the sewage sludge plus the solid phase from the wet oxidation onto the stream of molten lead at the heat end portion to form a layer thereon, maintaining non-oxidizing conditions in the pyrolysis chamber whereby during travel with the stream of molten lead from the head end to the foot end, organic components of the material fed onto the stream of molten lead are thermally decomposed to gases and vapors and a carbonaceous component containing char, while metals and inorganic materials, including silica and sand, which are insoluble in molten lead and of a lower specific gravity remain on the surface of the stream of molten lead, metals and inorganic materials which are soluble in molten lead dissolve in the molten lead to become a part of the stream, and metals and materials insoluble in molten lead and of a higher specific gravity fall to the bottom of the stream, removing said gases and vapors from said pyrolysis chamber, and separating the char, metals, and inorganic materials from said stream of molten lead.

4,010,099
SETTLERS FOR COPPER LIQUID EXTRACTION SYSTEMS

Bruce E. Leach, and Leroy Rose, both of Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.

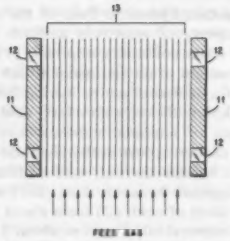
Filed July 10, 1975, Ser. No. 594,882
Int. Cl.² B01D *11/04*
U.S. Cl. 210—21 **4 Claims**

1. A method for counter-current phase separation of aqueous copper sulfate solutions and organic phases in substantially vertical settler tanks and substantially horizontal settler pipes wherein the aqueous copper sulfate solution and organic phase are contacted counter-currently to the direction of phase separation, comprising compartmenting the bottoms of said tanks and pipes, flowing said solutions and organic phases over said compartments to coalesce the organic phase to form droplets, said droplets then rising to contact the aqueous solution and facilitate phase disengagement.

4,010,100
ISOTOPE SEPARATION BY PHOTOCHROMATOGRAPHY

Kenneth S. Suslick, Stanford, Calif., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Oct. 3, 1975, Ser. No. 619,156
Int. Cl.² B01D *15/08*
U.S. Cl. 55—67 **8 Claims**



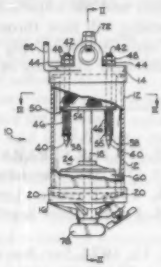
1. A method for isotope separation which comprises:
a. physically adsorbing on an adsorptive surface an isotopically mixed molecular species consisting of a desired isotopic species and at least one undesired isotopic species.
b. irradiating the adsorbed isotopically mixed molecular species with radiation of a predetermined wavelength which will excite the adsorbed desired isotopic species without substantially exciting adsorbed undesired isotopic species, thereby desorbing the desired isotopic species to produce a fraction enriched in the desired isotopic species and a fraction depleted in the desired isotopic species, and
c. separating the fraction enriched in the desired isotopic species from the fraction depleted in the desired isotopic species.

4,010,101
LIQUID TRAP

Cyril Davey, 4 Tamara Flats, Tamara St., Tamara Park, Verwoerdburg, Transvaal, South Africa

Filed July 19, 1976, Ser. No. 706,492
Int. Cl.² B01D *29/00*
U.S. Cl. 210—86 **9 Claims**

1. A trapping device for a liquid supply line for trapping foreign liquids contained in a supply liquid, said foreign liquids having a specific gravity greater than that of the supply liquid, the device comprising
a tubular side wall having upper and lower ends,
a lower end piece defining a socket releasably receiving the lower end of the side wall,
an upper end piece defining a socket releasably receiving the upper end of the side wall,
sealing means forming seals between the end pieces and the side wall,
a settling chamber defined primarily by the side wall and the end pieces,
inlet and outlet chambers in said settling chamber and adjacent to said upper end piece,
an inlet leading through the upper end piece into said inlet chamber,
an outlet leading through the upper end piece from said outlet chamber,
a substantially imperforate wall separating said inlet and outlet chambers, said imperforate wall comprising a tubular hub and a pair of wing means at opposite sides of the hub and each diverging outwardly away from the hub,



flow paths connecting said settling chamber with said inlet and outlet chambers,
foraminous wall means partly defining said inlet and outlet chambers, said foraminous wall means being arranged across said flow paths whereby fluid passing through the chambers from the inlet to the outlet passes through at least one said foraminous wall means,
a pair of spaced contact means extending through the upper end piece and through said wing means into the settling chamber, said contact means having connector portions outside said settling chamber and connectable to an electrical warning signal circuit,
a float in the settling chamber having a specific gravity higher than that of the supply liquid and lower than that of the foreign liquids, and
a bridge member on the float for bridging the space between the contact means to establish an electrical path between said contact means when the float is raised to a predetermined level by floating on the foreign liquids.

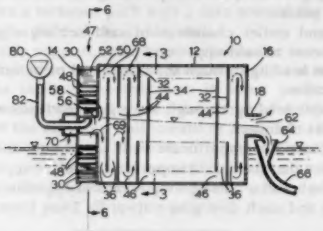
4,010,102
LIQUID TREATMENT APPARATUS HAVING PARALLEL ROTATING BAFFLES

Nils Göran Jarvsträt, Daggkapebacken 1, 552 46 Jonkoping, Sweden

Filed Feb. 10, 1975, Ser. No. 548,664
Claims priority, application Sweden, Feb. 14, 1974, 7401946
Int. Cl.² C02C *1/02*
U.S. Cl. 210—151 **12 Claims**

1. Apparatus for the biological treatment of waste liquid, said apparatus including an elongated substantially circular housing for containing said liquid, said housing having an inlet opening, an outlet opening, and a central axis, a stack of disc elements in said housing and positioned substantially parallel to each other and at right angles to said axis, some of said disc elements have central apertures at said axis and fitting closely at their peripheries to said housing to prevent passage of liquid therebetween, others of said disc elements being closed at

their centres and defining second apertures located at their peripheries adjacent said housing said housing including both such types of disc elements alternating with each other, adjacent disc elements defining channels therebetween, and means for rotating said disc elements in the liquid in said



housing, whereby liquid and air impelled into said housing through said inlet opening will flow through said housing to said outlet opening in respective revolving tortuous paths, and means for rotating said disc elements in the liquid in said housing.

4,010,103

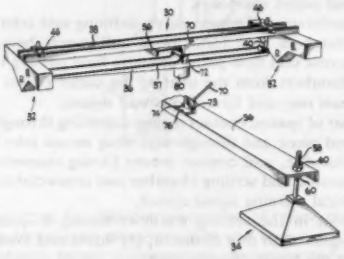
AUTOMATIC OIL-WATER SEPARATING DEVICE

Jerry E. Morgan, 352 67th St., Clarendon Hills, Ill. 60514; William M. Lynch, 621 Western Ave., Glen Ellyn, Ill. 60137, and Paul M. Pelton, 1209 South Gates, West Chicago, Ill. 60185

Filed Aug. 12, 1974, Ser. No. 496,515

Int. Cl.² E02B *15/04*

U.S. Cl. 210—242 R **8 Claims**



1. Apparatus for skimming a lighter liquid floating on the surface of a more dense liquid, said apparatus comprising:

an elongate structural member supported by first float means located at each end thereof,

each of said first float means consisting of a shape comprising a greater volumetric displacement means in its upper portion as compared to its lower portion,

a U-shaped skimming trough having a horizontal skimming edge,

said trough being pivotably supported from said structural member along its elongate length,

an elongate arm with a first end connected to the central portion of said elongate structural member and extending at right angles to the central axis of said skimming trough,

means adjustably connecting said arm near said first end to the central portion of said U-shaped skimming trough and being constructed and arranged to dispose said arm approximately in the same horizontal plane as the horizontal skimming edge of said U-shaped trough,

second float means adjustably connected to a second end of said elongate arm,

said second float means consisting of a shape comprising a greater volumetric displacement means in its lower portion as compared to its upper portion,

and said skimming trough having formed in its lowermost portion an outlet through which lighter liquid skimmed into the trough over the horizontal skimming edge is removed to a separate location.

4,010,104

SOLUTIONS OF NEW COMPLEX ANTIMONY COMPOUNDS

Eduard Radlmann; Heinz Schaffner; Günter Lorenz, and Günther Nischk, all of Dormagen, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed May 8, 1975, Ser. No. 575,698

Claims priority, application Germany, May 8, 1974, 2422141

Int. Cl.² B27K *3/00*; **C09D** *5/18*; **C07F** *9/90*

U.S. Cl. 252—8.1 **14 Claims**

1. A fire retardant solution in a polar organic solvent of a complex reaction product of an antimony oxide with an α-hydroxy carboxylic acid which reaction product has been further reacted with a monoisocyanate.

4,010,105

OIL-IN-WATER EMULSION HYDRAULIC FLUID

Rosauro V. Holgado, Philadelphia, Pa., assignor to E. F. Houghton and Company, Norristown, Pa.

Filed Apr. 21, 1975, Ser. No. 569,661

Int. Cl.² C10M *1/06, 1/32*

U.S. Cl. 252—77 **6 Claims**

1. A fire-resistant hydraulic fluid of the oil-in-water type having the property of relatively uniform viscosity over a broad range of water contents comprising (1) from about 5 to about 15% by weight of an emulsifier which is the condensation product of a dialkanol amine having from 2 to 4 carbon atoms in the alkanol chains, with a fatty acid chosen from the group consisting of aliphatic monocarboxylic acids having from 16 to 22 carbon atoms in the aliphatic chain, and reactive esters and halides thereof; said dialkanol amine being present in an amount between about 0.75 and 1.25 equivalents per equivalent of acid; (2) from about 10 to about 30% by weight of a mineral oil; (3) from about 5 to about 15% of a water soluble polyglycol selected from the group consisting of polyoxyalkylene glycols and their lower monoalkyl derivatives having a molecular wieght of at least about 400; (4) from about 10 to about 25% of glycol selected from the group consisting of mono- and di- ethylene and propylene glycols, and (5) from about 30 to about 50% water, the molecular weight of said polyglycol and the viscosity of said mineral oil being such that the viscosity of said hydraulic fluid is within the range of from about 100 to about 600 SUS at 100° F., and said viscosity varies less than about 120 SUS at 100° F. with changes in water content within said range of from about 30 to about 50% water.

4,010,106

CORROSION-RETARDING FUNCTIONAL FLUID

Kenneth Rothert, San Francisco, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Feb. 2, 1976, Ser. No. 654,666

Int. Cl.² C10M *1/48*

U.S. Cl. 252—32.7 E **8 Claims**

1. A lubricating oil composition comprising:

a. an oil of lubricating viscosity, and

b. an effective amount of each of the following:

1. an alkenyl succinimide,
2. a Group II metal salt of a dihydrocarbyl dithiophosphoric acid,
3. a friction modifier,
4. a basic sulfurized alkaline earth metal alkyl phenate, and
5. a chlorinated olefin.

4,010,107

CORROSION-INHIBITING FUNCTIONAL FLUID

Kenneth Rothert, San Francisco, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Feb. 2, 1976, Ser. No. 654,667
Int. Cl.² C10M *1/48*
U.S. Cl. 252—32.7 E 7 Claims

1. A lubricating oil composition comprising:
a. an oil of lubricating viscosity, and
b. an effective amount of each of the following:
1. an alkenyl succinimide,
2. a Group II metal salt of a dihydrocarbyl dithiophosphoric acid,
3. a friction modifier,
4. a Group II metal salt of a hydrocarbyl sulfonic acid, and
5. a chlorinated olefin.

4,010,108

RADIOACTIVE WASTE DISPOSAL OF WATER CONTAINING WASTE USING UREA-FORMALDEHYDE RESIN

Kenneth A. Gablin, Burton, and Larry J. Hansen, Tacoma, both of Wash., assignors to Nuclear Engineering Company, Inc., Louisville, Ky.

Continuation of Ser. No. 220,449, Jan. 24, 1972, abandoned. This application Nov. 29, 1973, Ser. No. 420,008
Int. Cl.² G21F *9/16, 9/12*; C02B *1/32*
U.S. Cl. 252—301.1 W 21 Claims

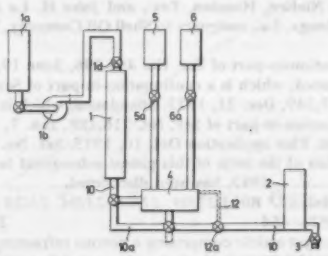
1. The method of solidifying radioactive waste material containing free water into a free standing body, comprising:
A. providing a mixture of radioactive waste material and water in a controlled amount sufficient to meet a desired low hazard radiation classification when solidified with urea-formaldehyde and urea-formaldehyde in a partially polymerized state in an amount sufficient to solidify substantially all of the water present,
B. adding an acidic curing agent capable of promoting polymerization of said urea-formaldehyde in an amount sufficient to solidify said urea-formaldehyde in said mixture, and
C. stirring the materials together to provide the desired distribution of radioactive waste material and allowing the mixture to gel and set whereby a solid mass of the resin is obtained with the water and the radioactive components of the resulting mixture distributed therein.

4,010,109

DEVICE FOR MARKING FLUENT MATERIALS

Karol Akerman, and Kurt Sauerwein, both of Dusseldorf, Germany, assignors to Kurt Sauerwein, Dusseldorf, Germany

Filed July 2, 1973, Ser. No. 375,635
Int. Cl.² B65C *3/00*
U.S. Cl. 252—301.15 7 Claims



1. A device for marking contained industrial fluent materials with a radio-active substance, said device comprising, in combination, an isotope generator charged with a radio-active substance with continuously produces a relatively short-life radio-active daughter substance, means for feeding a solvent for said daughter substance in controlled quantities under pressure into said generator to dissolve said daughter substance and form an isotope carrier, an equalizing reservoir for temporarily storing an isotope carrier conducted thereto, a mixing and reaction vessel adapted to be connected to at least one storage container containing an additive which reacts with said isotope carrier, a fixed pipe leading from said generator to said equalizing reservoir, means interconnecting the generator with the mixing and reaction vessel for selectively shunting the isotope carrier from the pipe to the mixing and reaction vessel, means for selectively coupling the output of the mixing and reaction vessel to the pipe, and a dosing valve permanently coupled between the output of said equalizing reservoir and the container for said fluent material for controlling the release of said carrier from said reservoir to said container.

6. A device for use in marking contained industrial fluent material with a radioactive substance, comprising in combination,
an isotope generator charged with a radioactive substance which continuously produces a relatively short-life radioactive daughter substance;
automatically controlled dosing means connected to said isotope generator for feeding a solvent for said daughter substance into said generator to dissolve said daughter substance and thereby form an isotope carrier;
an equalizing reservoir for temporarily storing an isotope carrier conducted thereto;
a mixing and reaction vessel adapted to be connected to at least one storage container containing an additive which reacts with said isotope carrier;
a fixed pipe leading from said generator to said equalizing reservoir;
means interconnecting the generator with the mixing and reaction vessel for selectively shunting the isotope carrier from the pipe to the mixing and reaction vessel;
means for selectively coupling the output of the mixing and reaction vessel to the pipe;
and a dosing valve permanently coupled between the output of said equalizing reservoir and the container for said fluent material for controlling the release of said carrier from said reservoir to the container for said fluent material.

4,010,110

PROCESS FOR DISPERSING CONTAMINANTS IN CIRCULATING WATER OR POLAR ORGANIC LIQUID SYSTEM

Joseph P. Cosentino, Nutley, and Frederick R. Mahn, Verona, both of N.J., assignors to Drew Chemical Corporation, Parsippany, N.J.

Division of Ser. No. 169,820, Aug. 6, 1971, Pat. No. 3,962,119. This application Mar. 5, 1976, Ser. No. 664,073
Int. Cl.² B01J *13/00*
U.S. Cl. 252—314 11 Claims

1. A process for dispersing contaminants in a circulating water or polar organic liquid system, comprising:
adding to the system a dispersing composition consisting essentially of:
a. an oxyalkylene polymer having a molecular weight from about 500 to about 5000 wherein the recurring units consist of a member selected from the group consisting of oxypropylene, oxyethylene and mixtures thereof; and
b. a polysiloxane-polyoxyalkalene block copolymer having a molecular weight from about 500 to about 10,000 wherein the polysiloxane block consists essentially of recurring units of a dialkyl siloxane wherein the alkyl group has from 1 –3 carbon atoms and the oxyalkylene block consists essentially of recurring units of a member selected from the group consisting of oxypropyl-

ene, oxyethylene and mixtures thereof, said components (a) and (b) being present in an amount effective to disperse contaminants in aqueous and polar organic liquid systems.

4,010,111

CORROSION INHIBITOR USED IN BRINES CONTAINING OXYGEN

George D. Chappell, Rosenberg, and James R. Stanford, Sugar Land, both of Tex., assignors to Nalco Chemical Company, Oak Brook, Ill.

Continuation-in-part of Ser. No. 441,614, Feb. 11, 1974, abandoned, which is a continuation-in-part of Ser. No. 271,462, July 13, 1972, abandoned. This application Mar. 29, 1976, Ser. No. 671,456

Int. Cl.² C23F *11/16*, *11/14*, *11/12*

U.S. Cl. 252—391 **9 Claims**

1. A corrosion inhibiting composition for aqueous brine water containing dissolved oxygen therein, said corrosion inhibiting composition prepared by the following steps:

A. reacting at from 200° to 250° C for 1 to 3 hours a carboxylic acid from the group consisting of acyclic monocarboxylic acid and polycarboxylic acid containing from 1 to 48 carbon atoms with a polyamine having the structure $H_2N(R—NH)_xH$ wherein R is an alkylene group containing from 2 to 6 carbon atoms and x is a small whole number greater than 1, wherein the molar ratio of said carboxylic acid to said polyamine ranges from 1:1 to 5:1;

B. cooling the composition formed in step A;

C. adding with mixing from 1 to 50% by weight based on polyamine of an alcohol from the group consisting of methanol, n-propanol, butanol and mixtures thereof;

D. adding from 1 to 5% by weight based on said polyamine of dodecylbenzene sulfonic acid;

E. adding with mixing from 1 to 10% by weight based on said polyamine of a high molecular weight organic acid from the group consisting of dimer and trimer acids and mixtures thereof having from 36 to 54 carbon atoms; and

F. adding with mixing from 0.01 to 0.5% by weight based on said polyamine of an organic water-in-oil emulsion breaker.

4,010,112

PRODUCTION OF AQUEOUS SOLUTIONS OF CHLORINE DIOXIDE AND CHLORINE

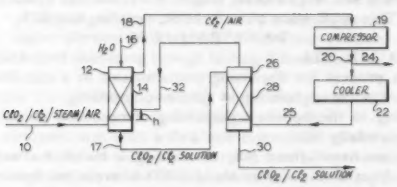
Gerald Cowley, and Maurice C. J. Fredette, both of Mississauga, Canada, assignors to Erco Industries Limited, Islington, Canada

Filed Oct. 20, 1975, Ser. No. 623,773

Claims priority, application Canada, Sept. 18, 1975, 235827

Int. Cl.² C01B *11/02*

U.S. Cl. 252—187 R **29 Claims**



1. A method of forming an aqueous solution of chlorine dioxide and chlorine from a gaseous mixture thereof, which comprises:

contacting a gaseous mixture of chlorine dioxide and chlorine with water to dissolve all the chlorine dioxide therefrom and part of the chlorine therefrom to form an aqueous solution of chlorine dioxide and chlorine,

recovering gaseous chlorine substantially free from chlorine dioxide from said contacting step,

increasing the partial pressure of said gaseous chlorine to a value exceeding that of chlorine in said gaseous mixture of chlorine dioxide and chlorine to provide chlorine of increased partial pressure,

contacting said aqueous solution of chlorine dioxide and chlorine with said chlorine of increased partial pressure to cause an increase in the dissolved concentration of chlorine in said solution, and

recovering the resulting chlorine-enriched aqueous solution of chlorine dioxide and chlorine.

4,010,113

CATALYST FOR METATHESIS OF CYCLOOLEFINS

Eilert A. Ofstead, Cuyahoga Falls, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 456,913, April 1, 1974, Pat. No. 3,945,986. This application Nov. 17, 1975, Ser. No. 632,553

Int. Cl.² B01J *31/02*

U.S. Cl. 252—429 B **3 Claims**

1. A methathesis catalyst composition comprised of (A) at least one transition metal salt selected from the group consisting of tungsten halides, tungsten oxyhalides, molybdenum halides and molybdenum oxyhalides, (B) at least one compound selected from the group consisting of dialkylaluminum halides, alkylaluminum sesquihalides and alkylaluminum dihalides, and (C) at least one compound of the general formula ROH wherein R is selected from the group consisting of alkyl and cycloalkyl, and wherein R contains a nitrile substituent situated on the carbon atom adjacent to that bearing the hydroxy group, and wherein the molar ratio of A:B:C lies within the range of 1:0.5–10:0.5–3.

4,010,114

OXIDATIVE DEHYDROGENATION CATALYST

Darrell W. Walker, and Floyd E. Farha, Jr., both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Apr. 30, 1975, Ser. No. 573,210

Int. Cl.² B01J *27/14*

U.S. Cl. 252—437 **9 Claims**

1. An oxidative dehydrogenation catalytic material consisting essentially of from about 26 to about 75 weight percent of nickel, in association with from about 1 to about 50 weight percent of tin, from about 0.5 to about 10 weight percent of lead, from about 0.5 to about 10 weight percent of phosphorus, from about 0.5 to about 6 weight percent of potassium, and sufficient oxygen to satisfy the valence requirements of the elements, wherein the weight percent values are based on weight of the unsupported catalytic material and wherein at least one of said nickel, said tin, said phosphorus or said potassium is combined with oxygen.

4,010,115

CATALYST FOR THE OXIDATION OF ETHYLENE TO ETHYLENE OXIDE

Robert P. Nielsen, Houston, Tex., and John H. La Rochelle, Baton Rouge, La., assignors to Shell Oil Company, Houston, Tex.

Continuation-in-part of Ser. No. 480,896, June 19, 1974, abandoned, which is a continuation-in-part of Ser. No. 317,349, Dec. 21, 1972, abandoned, which is a continuation-in-part of Ser. No. 216,188, Jan. 7, 1972, abandoned. This application Oct. 10, 1975, Ser. No. 621,268

The portion of the term of this patent subsequent to June 8, 1993, has been disclaimed.

Int. Cl.² B01J *21/04*, *21/08*, *23/04*, *23/50*

U.S. Cl. 252—454 **27 Claims**

1. A catalyst article comprising a porous refractory support having deposited on its exterior and pore surfaces from about 2% by weight to about 20% by weight of silver and, coincidentally deposited with silver, a total of from about 4.0×10^{-5} gew per kilogram of total catalyst to about 8.0×10^{-3} gew per

kilogram of total catalyst of alkali metal present in final form on the support in the form of an oxide in which the said oxide consists of the oxide of potassium optionally combined with a minor amount of an oxide of rubidium or cesium or mixtures of rubidium and cesium oxides relative to said potassium oxide.

4,010,116

FLUID CRACKING CATALYSTS

Robert B. Secor, Whittier; Robert A. Van Nordstrand, Pasadena, and David R. Pegg, Montebello, all of Calif., assignors to Filtrol Corporation, Los Angeles, Calif.

Filed Oct. 15, 1974, Ser. No. 514,567

Int. Cl.² B01J *29/06*

U.S. Cl. 252—455 Z **37 Claims**

1. A cracking catalyst comprising a cation exchanged zeolite of the faujasite type in the range of about 10 parts by weight to about 25 parts by weight, peptized pseudoboehmite substantially free of sodium in the range of from about 10 parts by weight to about 25 parts by weight, and SMM in the range from about 20 parts by weight to about 65 parts by weight; and clay in the range of about 10 to about 50 parts by weight, the sum of the parts all equaling 100 parts by weight.

4,010,117

ELECTROCONDUCTIVE MATERIAL

Motokazu Maruhashi, Takatsuki; Shuji Tsutsumi, Kusatsu, and Shinichi Komazawa, Kobe, all of Japan, assignors to Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Aug. 28, 1975, Ser. No. 608,719

Claims priority, application Japan, Sept. 2, 1974, 49-101189; Sept. 19, 1974, 49-108987

Int. Cl.² H01B *1/04*

U.S. Cl. 252—500 **5 Claims**

1. An electroconductive material comprising a copolymer of (A) 50 to 70% by mole of styrene-sulfonic acid salt and (B) 50 to 30% by mole of at least one member selected from the group consisting of alkyl acrylates having an alkyl group of 1 to 10 carbon atoms, alkyl methacrylates having an alkyl group of 1 to 10 carbon atoms, acrylonitrile and methacrylonitrile.

4,010,118

HIGH TEMPERATURE HOT CONDUCTORS

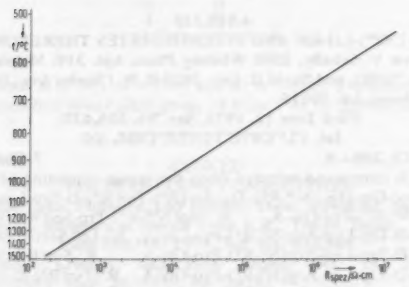
Horst Walch, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Apr. 19, 1976, Ser. No. 678,067

Claims priority, application Germany, Apr. 28, 1975, 2518865

Int. Cl.² H01B *1/08*

U.S. Cl. 252—521 **3 Claims**



1. A hot conductor for use in high temperature environments comprised of a sintered oxide material consisting essentially of containing a mixture of cerium oxide and gadolinium oxide.

4,010,119

HIGH TEMPERATURE HOT CONDUCTORS

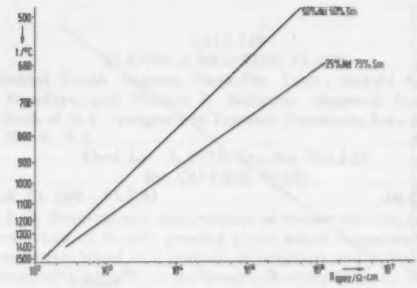
Horst Walch, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Apr. 19, 1976, Ser. No. 678,068

Claims priority, application Germany, Apr. 28, 1975, 2518894

Int. Cl.² H01B *1/08*

U.S. Cl. 252—521 **5 Claims**



1. A hot conductor for use in high temperature enviornments comprised of a sintered oxide material consisting essentially of a mixture of neodymium oxide and samarium oxide.

4,010,120

HIGH TEMPERATURE HOT CONDUCTORS

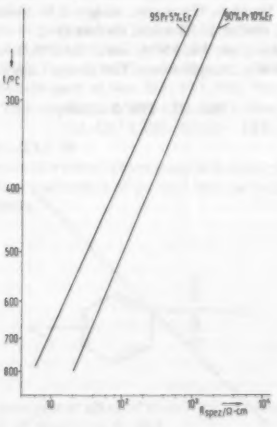
Horst Walch, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Apr. 19, 1976, Ser. No. 678,069

Claims priority, application Germany, Apr. 28, 1975, 2518901

Int. Cl.² H01B *1/08*

U.S. Cl. 252—521 **5 Claims**

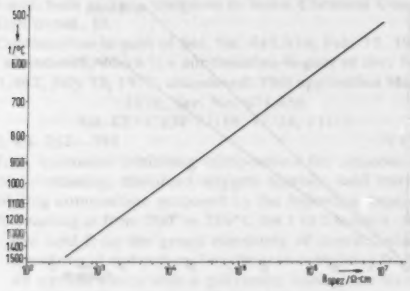


1. A hot conductor for use in high temperature environments comprised of a sintered oxide material consisting essentially of a mixture of praseodymium oxide and eribum oxide.

4,010,121
HIGH TEMPERATURE HOT CONDUCTORS

Horst Walch, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Apr. 19, 1976, Ser. No. 678,070
Claims priority, application Germany, Apr. 28, 1975, 2518856
Int. Cl.² H01B 1/08
U.S. Cl. 252—521 3 Claims

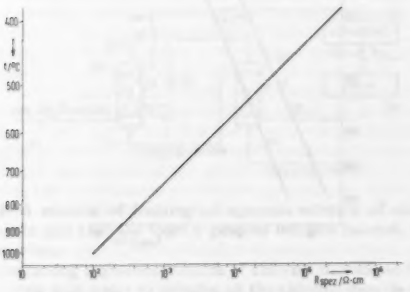


1. A hot conductor for use in high temperature environments comprised of a sintered oxide material consisting essentially of containing a mixture of neodymium oxide and gadolinium oxide.

4,010,122
HIGH TEMPERATURE HOT CONDUCTORS

Horst Walch, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Apr. 19, 1976, Ser. No. 678,076
Claims priority, application Germany, Apr. 28, 1975, 2518837
Int. Cl.² H01B 1/08
U.S. Cl. 252—521 3 Claims



1. A hot conductor for use in high temperature environments comprised of a sintered oxide material consisting essentially of a mixture of terbium oxide and erbium oxide.

4,010,123
CELLULAR MATERIAL

Geoffrey Vincent Dallow Blunt; Newton John Hodges, and Robert James Pragnell, all of Cheltenham, England, assignors to Coal Industry (Patents) Limited, London, England

Continuation of Ser. No. 345,575, March 28, 1973, abandoned. This application Feb. 13, 1975, Ser. No. 547,328
Claims priority, application United Kingdom, Apr. 6, 1972, 15942/72
Int. Cl.² C08J 9/06; C08L 21/00, 95/50
U.S. Cl. 260—2.5 H 10 Claims

1. A process for the production of a cellular material by vulcanizing a mixture containing between 10% and 50% of a mixture of rubber together with sufficient vulcanizing agents to form an ebonite with the rubber, not more than 10% of a solid filler, and a chemical blowing agent, whereby an ebonite structure is formed, so that, during the vulcanization, the chemical blowing agent decomposes or reacts to produce a gas, the viscosity of the composition during the procedure of the gas increasing whereby cells are retained in the composition wherein the mixture further contains between about 52% and 87% of a bituminous material.

7. A cellular plastics material containing between about 52% and 87% of a bituminous material, and between 10% and 50% of an ebonite matrix formed of rubber and a vulcanizing agent filler and including at least 25% by volume of closed cells.

4,010,124
PROCESS FOR FLAMEPROOFING POLYURETHANES

Peter Hofmann, and Peter Rohringer, both of Basel, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 399,577, Sept. 21, 1973, abandoned, which is a continuation of Ser. No. 266,194, June 26, 1972, abandoned. This application Apr. 2, 1975, Ser. No. 564,410
Claims priority, application Switzerland, July 5, 1971, 9829/71
Int. Cl.² C08K 5/53
U.S. Cl. 260—2.5 AJ 7 Claims

1. An improved process for flameproofing polyurethanes using 1 to 15 percent by weight based on the polyurethane of a reactive phosphonate as flameproofing agent wherein the improvement comprises

incorporating as the flameproofing agent the reaction product based on a molar ratio of (1) 1 to 2 mols of dimethyl methanephosphonate; (2) 0.75 to 1 mol of an alkanediol or alkanetriol of 2to 6 carbon atoms; and (3) 0 to 1 mol of an epoxide having 2 to 4 carbon atoms; into a mixture of polyol and diisocyanate components from which the polyurethane is produced.

4,010,125
[D-TRP⁸]-LH-RH AND INTERMEDIATES THEREFOR

Andrew V. Schally, 2500 Whitney Place, Apt. 319, Metairie, La. 70002, and David H. Coy, 3823 B. St. Charles Ave., New Orleans, La. 70115

Filed June 12, 1975, Ser. No. 586,437
Int. Cl.² C07C 103/52; C08L 100
U.S. Cl. 260—8 7 Claims

5. A compound selected from the group consisting of R^6-(pyro)-Glu-His-(N^{im}-R^5)-Trp-Ser(R^4)-Tyr(R^3)-D-Trp-Leu-Arg(N^G-R^2)-Pro-Gly-A, R^7-His(N^{im}-R^5)-Trp-Ser(R^4)-Tyr-(R^3)-D-Trp-Leu-Arg(N^G-R^2)-Pro-Gly-A, R^7-Trp-Ser(R^4)-tyr-(R^3)-D-Trp-Leu-Arg(N^G-R^2)-Pro-Gly-A, R^7-Ser(R^4)-Tyr-(R^3)-D-Trp-Leu-Arg(N^G-R^2)-Pro-Gly-A, R^7-Tyr(R^3)-D-Trp-Leu-Arg-(N^G-R^2)-Pro-Gly-A, and R^7-D-Trp-Leu-Arg(N^G-R^2)-Pro-Gly-A, in which [R^2, R^3, R^4 and R^5 are protective groups capable of being removed by one or more chemical treatments which do not effect (pyro)-Glu-His-Trp-Ser-Tyr-D-Trp-Leu-Arg-Pro-Gly-NH_2,] R^2 is a protective group for the N , N , and N nitrogen atoms of arginine selected from the

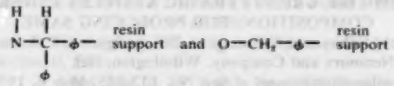
group consisting of tosyl, nitro, benzyloxycarbonyl and adamantyioxycarbonyl;

R^3 is a protective group for the hydroxyl of tyrosine selected from the group consisting of 2-bromo-benzyloxycarbonyl, benzyl, acetyl, tosyl, benzoyl, t-butyl, tetrahydropyran-2-yl, trityl, 2,4-dichlorobenzyl and benzyloxycarbonyl;

R^4 is a protective group for the hydroxyl group of serine and is selected from the group defined hereinbefore for R^3;

R^5 is a protective group for the imidazole nitrogen atoms of histidine selected from the group of dinitrophenyl, tosyl, 2,2,2-trifluoro-1-benzoyloxycarbonylaminoethyl and 2,2,2-trifluoro-t-butyloxycarbonylaminoethyl; and

R^6 is hydrogen or an α-amino protective group and R^7 is an α-amino protective group, and A is selected from the class consisting of:



4,010,126
AQUEOUS EMULSION COPOLYMERS OF VINYL ALKANOATES, ALKYL, ACRYLATES, AND ACRYLIC MODIFIED ALKYDS

Edward J. Kuzma, Woodbridge, N.J., assignor to Celanese Corporation, New York, N.Y.

Filed Apr. 11, 1975, Ser. No. 567,212
Int. Cl.² C08L *94/00*
U.S. Cl. 260—22 CB **4 Claims**

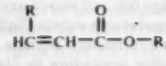
1. An aqueous emulsion vehicle comprising the interpolymerization reaction product of

a. from about 60 to about 90% by weight based on the total monomer/resin weight of at least one monomer having the polymerization-reactive $CH_2=C<$ grouping selected from the group consisting of

1. Vinyl acetate and
2. alkyl acetate and methacrylate monomers wherein the alkyl radical contains from 1 to 10 carbon atoms; and

b. from about 10 to about 40% by weight based on the total monomer/resin weight of an acrylic modified alkyd resin produced by the condensation reaction of at least one of each of the following:

1. an esterifiable polyhydric alcohol,
2. saturated, mono-unsaturated, or poly-unsaturated fatty acid or fatty acid oil;
3. A polycarboxylic acid or anhydride thereof; and
4. a monomer selected from the class of compounds having the formula:



wherein R is —H or $—CH_3$ and R_1 is —H or a branched or unbranched lower alkyl group of from 1 to 10 carbon atoms.

4,010,127
POLYETHYLENE COMPOSITION

Toshio Taka, Fujisawa, and Hideaki Toda, Kawasaki, both of Japan, assignors to Showa Yuka K.K., Tokyo, Japan

Filed Oct. 10, 1975, Ser. No. 621,569
Claims priority, application Japan, Oct. 15, 1974, 49-117675; Mar. 20, 1975, 50-32925
Int. Cl.² C08L
U.S. Cl. 260—23 R **10 Claims**

1. A high-molecular-weight polyethylene composition having superior processability which consists essentially of:

A. 100 parts by weight of a high-density polyethylene having a density of at least 0.93 g/cc, a melt index of less than 0.1 g/10 minutes and a molecular weight distribtuion, M_w/M_n, of not more than 10,

B. 0.1 to 5.0 parts by weight of a C_{16}–C_{25} aliphatic monocarboxylic acid and/or a zinc salt thereof, and

C. 0.1 to 5.0 parts by weight of at least one compound selected from the group consisting of polybutene, mineral oils and epoxy plasticizers.

4,010,128
FLEXIBLE PRINTING PLATE

Michael Frank Saggese, Nashville, Tenn.; Gerald Levine, Brooklyn, and William E. Beckman, Hopewell Junction, both of N.Y., assignors to Tenneco Chemicals, Inc., Saddle Brook, N.J.

Filed Apr. 2, 1975, Ser. No. 564,525
Int. Cl.² C08L *91/00*
U.S. Cl. 260—23.7 M **10 Claims**

1. A thermoplastic composition of matter suitable for the production of flexible printing plates which comprises a homogeneous blend of a mixture of polymers and at least one lubricant selected from the group consisting of metal salts of fatty acids, fatty acids, fatty alcohols, and waxes; said mixture of polymers comprising from about 30 to 50% by weight of a copolymer of an alpha-olefin having from 2 to 6 carbon atoms and a monoethylenically-unsaturated ester having from 4 to 12 carbon atoms, from about 15 to 35% by weight of a block copolymer selected from the group consisting of block copolymers of a mono-alkenyl aromatic hydrocarbon and a conjugated diene hydrocarbon and hydrogenated block copolymers of a mono-alkenyl aromatic hydrocarbon and a conjugated diene hydrocarbon, and from about 25 to 40% of a random copolymer of 1,3-butadiene and acrylonitrile; and said lubricant being present in an amount from about 0.1 parts to 10 parts by weight per 100 parts by weight of polymer mixture.

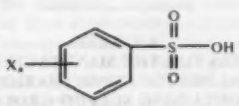
4,010,129
NOVEL PROCESSING AIDS FOR NATURAL AND SYNTHETIC RUBBER COMPOUNDS

Erwin Aron, Clifton, N.J., assignor to Technical Processing, Inc., Paterson, N.J.

Continuation-in-part of Ser. No. 430,556, Jan. 3, 1974, Pat. No. 3,882,062, which is a continuation-in-part of Ser. No. 421,689, Dec. 4, 1973, abandoned, which is a continuation-in-part of Ser. No. 411,975, Nov. 1, 1973, abandoned. This application Apr. 28, 1975, Ser. No. 572,326
Int. Cl.² C08L *91/00*
U.S. Cl. 260—23.7 M **8 Claims**

1. An improved rubber processing aid comprising:

a. an alkali or amine salt of an aromatic sulfonic acid having the formula:



where X is hydrogen or alkyl of from 4 to 14 carbon atoms and n has a value of from 1 to 5, and

b. optionally a long chain fatty organic acid having a maximum of about 22 carbon atoms in the chain

the improvement wherein the amount by weight of said fatty acid present is less than the amount by weight of said sulfonic acid salt, and said processing aid includes a thioether in an amount sufficient to catalyze the peptizing action of said salt.

4,010,130

HYDROGENATED RESIN AND COMPOSITIONS CONTAINING THE SAME

Kotaro Matsuo, Mino; Katsuhisa Shimizu, Kyoto; Michimasa Hoshiba, Takarazuka, and Machio Chihara, Osaka, all of Japan, assignors to Arakawa Rinsan Kagaku Kogyo Kabushiki Kaisha, Osaki, Japan

Division of Ser. No. 517,660, Oct. 24, 1974, abandoned. This application Sept. 19, 1975, Ser. No. 614,934

Claims priority, application Japan, Oct. 24, 1973, 48-120236

Int. Cl.² C08L *9/00; C08L 91/06*

U.S. Cl. 260—28.5 AV **4 Claims**

1. A hotmelt composition containing a copolymer of ethylene and ethylenically unsaturated monoester in an amount of 30 to 95% by weight and a tackifier in an amount of 70 to 5% by weight, said tackifier being a hydrogenated copolymer of a cyclopentadiene and an ethylenically unsaturated ester having a softening point of up to 150° C, an iodine value of 0 to 50, a saponification value of 4 to 330, a number average molecular weight of 200 to 800 and a ratio of weight average molecular weight to number average molecular weight of 1 to 2.5.

4,010,131

QUATERNARY MODIFIED ACRYLAMIDE POLYMERS

Kenneth G. Phillips, River Forest; Edward G. Ballweber, Glenwood; Karen A. Nordquist, Clarendon Hills, and Robert A. Miller, Chicago, all of Ill., assignors to Nalco Chemical Company, Oak Brook, Ill.

Continuation-in-part of Ser. No. 486,715, July 8, 1974, abandoned. This application Apr. 18, 1975, Ser. No. 560,435

Int. Cl.² C08G *51/24*

U.S. Cl. 260—29.4 UA **10 Claims**

1. A process for preparing a stable water soluble quaternary modified acrylamide polymer which comprises the steps of:

A. preparing a formaldehyde adduct of a secondary amine containing 2–8 carbon atoms by mixing together an aqueous formaldehyde solution and a secondary amine containing 2–8 carbon atoms in a mole ratio of from 1:2 to 2:1 so as to produce a 0.1 to 55% by weight aqueous solution of the formaldehyde adduct of a secondary amine;

B. reacting said formaldehyde adduct of Step A with a 5–50% aqueous solution of an acrylamide polymer having an intrinsic viscosity of from 0.1 to 0.7 in a mole ratio of from 1:2 to 2:1 with mixing at ambient temperatures to produce a cationically modified acrylamide polymer;

C. reacting the cationically modified acrylamide of Step B with an alkylating agent, containing 1–7 carbon atoms at alkaline pH and at temperatures between 0–100° C in a mole ratio of alkylating agent to tertiary amine groups on said cationically modified acrylamide polymer of from 1:1 to 2:1 to produce a stable water soluble quaternary modified acrylamide polymer; and then,

D. adding to said water soluble quaternary modified acrylamide polymer a halogen free oxygen containing inorganic acid to a pH of 0–6 to produce a stable water soluble quaternary modified acrylamide polymer.

4,010,132

PROCESS FOR THE MANUFACTURE OF UREA-FORMALDEHYDE CONDENSATION POLYMERS CONTAINING SULPHO GROUPS

Alfred Renner, Munchenstein, Switzerland, assignor to Ciba-Geigy AG, Basel, Switzerland

Filed May 12, 1975, Ser. No. 576,938

Claims priority, application Switzerland, June 7, 1974, 7809/74

Int. Cl.² C08L *61/24, 61/34*

U.S. Cl. 260—29.4 R **11 Claims**

1. In a process for the manufacture of urea-formaldehyde condensation products the improvement according to which highly disperse, solid urea-formaldehyde condensation products are formed which contain sulpho groups and consist of compact, spherical, agglomerated primary particles having a diameter of less than 1 μm, the process comprising polycondensing a precondensate (P) of urea and formaldehyde and a condensation polymer (N) of naphthalenesulphonic acid and formaldehyde in aqueous solution at temperatures of 20° to 100° C to form a gel, the components being added in such ratio that the molar ratio of formaldehyde to urea in the reaction mixture at the moment of gelling is 1.25 to 2, these molar ratios taking into account both the free starting products (formaldehyde and urea) and the monomeric starting products chemically bound in the intermediate products.

4,010,133

LOW-FIRE GREEN CERAMIC ARTICLES AND SLIP COMPOSITIONS FOR PRODUCING SAME

Takashi Nakayama, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 147,215, May 6, 1971, abandoned. This application Mar. 22, 1973, Ser. No. 343,686

Int. Cl.² C08L *33/02;* **C08K** *3/00*

U.S. Cl. 260—29.6 TA **13 Claims**

1. In a slip composition for formation of green ceramic articles, a slurry comprising a finely divided inorganic powder blended with an organic polymeric binder and a volatile liquid medium; wherein said inorganic powder consists essentially of, by weight,

A. 85–99% barium titanate,

B. 0.5–10% bismuthate glass frit, and

C. 0.5–5% Fe_2O_3;

components (A), (B) and (C) being sufficiently finely divided to pass through a No. 325 screen, and said organic polymeric binder is 1–15% of the weight of the inorganic powder; said organic polymeric binder being selected from the class consisting of, by weight,

1 acrylate copolymers of 50–75% alkyl acrylate ester, 25–50% alkyl methacrylate ester, and 0.2–2% acrylic acid and methacrylic acid, wherein in said esters alkyl is one or more radicals selected from among methyl, ethyl, propyl, butyl or 2-ethylhexyl;

2. ethylene copolymers of

i. 20–79.5% ethylene;

ii. 20–79.5% of one or more comonomers from among vinyl esters of saturated 1–6 carbon atoms aliphatic monobasic carboxylic acids; butyl acrylate; vinyl-2-ethylhexoate; and dibutyl maleate; and

iii. 0.5–10% of one or more comonomers from among acrylic acid, methacrylic acid, N-methylol acrylamide, itaconic acid; and glycidyl methacrylate;

3. and mixtures of (1) and (2); said slip composition on drying producing green ceramic articles which exhibit excellent storage life and which are fireable to ceramic articles at temperatures substantially below the sintering temperature of barium titanate.

2. A slip composition according to claim **1** wherein said volatile liquid medium consists essentially of water and said organic polymer binder is said acrylate copolymer.

4,010,134

PLASTER MIXTURE CONSISTING OF AN AQUEOUS POLYMER DISPERSION CONTAINING PIGMENT AND FILLER

Herbert Braunisch, Diedenbergen, Taunus, and Heinz Lehmann, Kriftel, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed May 13, 1975, Ser. No. 577,090

Claims priority, application Germany, May 15, 1974, 2423618

Int. Cl.² C08L *33/00*

U.S. Cl. 260—29.6 S **5 Claims**

1. In a plaster composition for preparing sound absorbing

resin-based plasters consisting essentially of an aqueous polymer dispersion containing pigments and mineral fillers, the improvement which comprises using a dispersion polymer having a dilatometric second order transition temperature of −20° C. to +10° C. and a mixture of pigment and filler of such a grain size that 70% by weight of the mixture has a grain size of 0.35 to 1.5 mm.

4,010,135

COMPOSITION AND METHOD FOR DISPERSING HIGH MOLECULAR WEIGHT FLOCCULANT POLYMERS IN WATER

Thomas R. Tutein, Cary, Ill., assignor to Chemed Corporation, Cincinnati, Ohio

Filed Sept. 3, 1975, Ser. No. 610,034
Int. Cl.² C08L *33/02*
U.S. Cl. 260—29.6 HN **14 Claims**

1. A new and improved composition for preparing solutions of high molecular weight polymers or copolymers, such solutions to be used in treating water and waste systems which consists of a combination of the flocculant polymer or copolymer with an inert additive and a bonding agent selected from the group consisting of ethylene glycol, propylene glycol, diethylene glycol, or acetic acid; said compositions, when added to water, producing initial slowing of the rate of solution of the polymer or copolymer, allowing time for dispersion and separation of the solid particles, thereby expediting final solution, and preventing the formation of agglomerates of the polymers or copolymers.

4,010,136

LOW DUROMETER SILOXANE ELASTOMERS CONTAINING POLYTETRAFLUOROETHYLENE POWDER

John D. Blizzard, and Carl M. Monroe, both of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed June 30, 1975, Ser. No. 591,906
Int. Cl.² C08L *83/04*
U.S. Cl. 260—37 SB **14 Claims**

1. A composition consisting essentially of,

a. 100 parts by weight of polydiorganosiloxane gum having a Williams plasticity of from 0.040 to 0.100 inches and having an average of from 1.999 to 2.001 organic radicals per silicon atom, at least 95 percent of the organic radicals being methyl, any remaining organic radical being selected from the group consisting of 3,3,3-trifluoropropyl and monovalent hydrocarbon radicals having from 1 to 6 carbon atoms, no more than 0.1 percent of all organic radicals in (a) having aliphatic unsaturation, said gum being endblocked with radicals selected from the group consisting of silicon-bonded hydroxyl radicals and silicon-bonded vinyl radicals,

b. from 15 to 25 parts by weight of a reinforcing silica filler having a surface area of at least 50 square meters per gram,

c. from 0.3 to 1.0 parts by weight, for every 100 parts by weight of the total of (a) plus (b) of a polytetrafluoroethylene powder having an average particle diameter of less than 1,000 microns and,

d. from 0 to 3.0 percent by weight, based on the total weight of said composition of a organic peroxide curing agent.

4,010,137

PHOSPHORUS-CONTAINING FLAME RETARDANT FOR SYNTHETIC RESINS

Donnie G. Brady, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Continuation-in-part of Ser. No. 382,169, July 24, 1973, Pat. No. 3,936,416. This application Dec. 15, 1975, Ser. No. 641,042
Int. Cl.² C08K *5/52*
U.S. Cl. 260—45.8 NT **50 Claims**

1. A phosphorus-containing flame retardant for synthetic resins comprising the product which results when 1–100 parts by weight of phosphorus oxide having the formula $(P_2O_5)_{0.5\text{-}1.0}(H_2O)_{0.0\text{-}1.5}$, 1–100 parts by weight of melamine, and 1–100 parts by weight of polyol selected from at least one saturated open-chain polyol containing from 5 to 15 carbon atoms and from 4 to 8 hydroxyl groups are combined and heated under such conditions that when said product is incorporated into a synthetic resin in an amount sufficient to impart flame retardance said product will not cause significant foaming of the synthetic resin composition when said composition is subjected to molding conditions.

23. A flame retardant according to claim **1** comprising the product that results when about 30 to about 100 parts by weight of orthophosphoric acid is added to about 5 to about 90 parts by weight of polyol selected from at least one of pentaerythritol, dipentaerythritol, and tripentaerythritol, and to that is added 40 to about 125 parts by weight of urea and then the admixture is heated until substantially all the esterification has taken place to yield an esterification product, then said esterification product is combined with melamine in such an amount that the weight ratio of said esterification product to the melamine is in the range of 10:1 to 1:2 and then the mixture is heated under such conditions that sufficient foaming occurs to insure that after the flame retardant is incorporated into a synthetic resin there will be no significant foaming when said synthetic resin composition is subjected to molding conditions.

4,010,138

METHOD FOR IMPROVING THE HEAT STABILITY OF POLYVINYL CHLORIDE

Adam J. Ejk, Piscataway, and Robert C. Ringwood, Jr., Sewaren, both of N.J., assignors to M & T Chemicals Inc., Greenwich, Conn.

Division of Ser. No. 454,364, March 25, 1974, abandoned. This application Dec. 6, 1974, Ser. No. 530,357
Int. Cl.² C08K *5/52*
U.S. Cl. 260—45.75 S **6 Claims**

1. A method for improving the heat stability exhibited by shaped articles prepared using plasticized vinyl chloride polymer compositions consisting essentially of

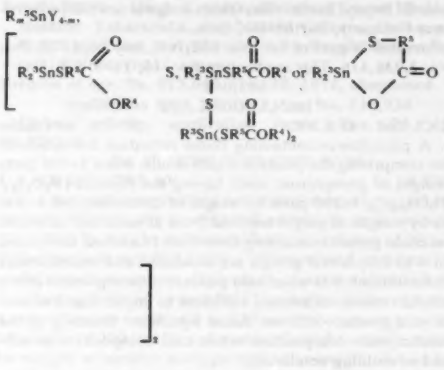
a. a vinyl chloride homopolymer or a copolymer wherein at least 50% of the repeating units are derived from vinyl chloride, the remaining repeating units being derived from one or more ethylenically unsaturated compounds which are copolymerizable with vinyl chloride;

b. between 5 and 60%, based on the weight of said composition of a plasticizer for vinyl chloride polymers;

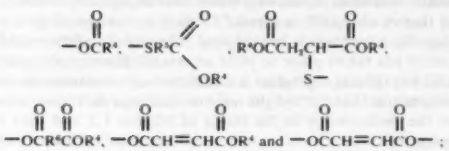
c. between 0.5 and 5%, based on the weight of said composition, of an organic ester of phosphorous acid, said ester exhibiting the general formula $P(OR^1)_3$ or $P(OR^1)_2(OR^2)$ wherein R^1 and R^2 are each selected from the group consisting of alkyl radicals containing between 1 and 20 carbon atoms, cycloalkyl, aralkyl, aryl, alkaryl radicals and hydrogen atoms with the proviso that the number of hydrogen atoms is 0 or 1,

the method comprising (1) adding to said polymer composition between 0.1 and 1%, based on the weight of said composi-

tion, of an organotin compound corresponding to the general formula $R_m^2SnY_{4-m}$,



wherein m represents the integer 1, 2 or 3 and Y represents a radical exhibiting a formula selected from the group consisting of $-SR^4$,



R^3 and R^4 are each individually selected from the group consisting of alkyl radicals containing between 1 and 20 carbon atoms, cycloalkyl, aralkyl, aryl and alkaryl radicals and R^5 is a methylene or ethylene radical and R^6 is an alkylene radical containing between 1 and 8 carbon atoms, inclusive, with the proviso that the organotin compound constitutes between 3 and 45% of the combined weight of the organotin compound and the organic ester of phosphorous acid, and (2) subsequently converting said composition into a product selected from the group consisting of shaped articles, films and coatings, wherein the conversion is accomplished in the absence of significant amounts of shear.

4,010,139

SELF-EXTINGUISHING POLYOLEFINIC COMPOSITIONS

Guido Bertelli, and Pierpaolo Roma, both of Ferrara, Italy, assignors to Montedison Fibre S.p.A., Milan, Italy

Filed Oct. 24, 1975, Ser. No. 625,771

Claims priority, application Italy, Oct. 28, 1974, 28851/74; Aug. 11, 1975, 26281/75; Aug. 11, 1975, 26280/75

Int. Cl.² C08K *3/26 5/56*

U.S. Cl. 428—35 **10 Claims**

1. Polyolefinic compositions suited for the manufacture of self-extinguishing articles, comprising:

1. a polyolefin selected from the group consisting of homopolymers and copolymers of ethylene, alpha olefins and styrene; and
2. a mixture of:
   a. a bismuth compound selected from the group consisting of basic bismuth carbonate and triphenyl-bismuthine; and
   b. a partially halogenated compound, thermically unstable, which on heating decomposes with the formation of the corresponding hydrogen halide; component (a) being present in such an amount as to have a bismuth content in the composition lower than 5% by weight, while component (b) is present in an amount comprised between 1% and 10% by weight of the composition.

4,010,140

AGE RESISTANT RESIN COMPOSITIONS AND ADMIXTURES USEFUL AS ADHESIVES

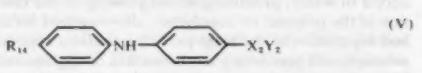
Herbert L. Bullard, Norton Village, and Robert A. Osborn, Stow, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Oct. 2, 1974, Ser. No. 511,412

Int. Cl.² C08F *15/02, 15/40;* **C08C** *9/14*

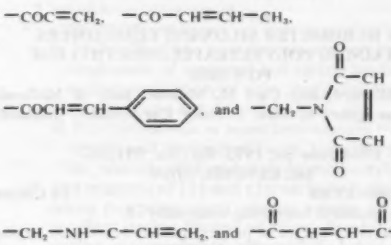
U.S. Cl. 260—47 UA **6 Claims**

1. An age resistant tackifying resin which comprises a composition having a softening point in the range of 0° C. to about 140° C. comprising (1) about 40 to about 80 weight percent units derived from aliphatic diolefins selected from piperylene, 1,3-butadiene and 2,3-dimethyl-1,3-butadiene, (2) about 60 to about 20 weight percent units derived from aliphatic monoolefins selected from isobutylene, 2-methyl-1-butene, 2-methyl-2-butene, 2,3-dimethyl-1-butene, 2,3-dimethyl-2-butene, 2-methyl-1-pentene, and 2-methyl-2-pentene, where the mole ratio of diolefin to monoolefin is about 0.7/1 to about 2:1, (3) about 0 to about 40 weight percent units derived from at least one of dicyclopentadiene and a vinyl aromatic compound selected from styrene and α-methyl styrene and (4) about 0.2 to about 2 weight percent units derived from at least one selected amine type compound, where said amine compounds are selected from an amine compound having the structure



(V)

where R_{14} is selected from hydrogen, methyl, ethyl and methoxy radicals, where X_2 is selected from the groups consisting of —NH, —N—CH(CH₃)—CH₂—CH₂—CH₃, and oxygen and where Y_2 is selected from the group consisting of $-COCH{=}CH_2$,



4,010,141

ANTI-FOULING COMPOSITION FOR USE IN WATER COMPRISING A POLYMER AND AN ORGANO TIN COMPOUND

Mitsuo Onozuka; Yasuo Hayashi, and Yoshiaki Adachi, all of Iwaki, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 248,270, April 17, 1972, Pat. No. 3,861,949. This application Jan. 10, 1975, Ser. No. 540,202

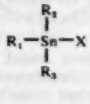
Claims priority, application Japan, Apr. 27, 1971, 46-27158; Nov. 1, 1971, 46-86263; Dec. 27, 1971, 47-105482

Int. Cl.² C08K *5/57*

U.S. Cl. 260—45.75 K **3 Claims**

1. An article to be used on or in the water, at least the surfaces of said article comprising an anti-fouling composition comprising a synthetic resin and an amount of a substance

effective to prevent fouling which comprises 0.5–200 parts by weight based on 100 parts by weight of said synthetic resin of an organo-tin compound of the formula:



wherein R_1 is n-dodecyl, R_2 and R_3 are methyl and X stands for a.

wherein R_4 is a C_8–C_{12} alkyl group and R_5 and R_6 are C_1–C_3 alkyl groups, the total number of alkyl carbon atoms in R_4, R_5 and R_6 being less than 15;

b. halogen;

c. an alkoxyl radical selected from the group consisting of a residue of a saturated or unsaturated straight chain or branched aliphatic alcohol, a saturated or unsaturated cycloaliphatic alcohol and an aromatic alcohol, the number of carbon atoms being 3–24,

d. a thioalkoxyl radical selected from the group consisting of a residue of a saturated or unsaturated straight chain or branched aliphatic thioalcohol, a saturated or unsaturated cycloaliphatic thioalcohol and an aromatic thioalcohol, the number of carbons included in the alcohol being 3–24; or

e. an organic acid radical selected from the group consisting of a mono-, di- or tribasic C_2–C_{24} saturated, unsaturated, straight chain or branched chain aliphatic, cycloaliphatic and aromatic carboxylic acid.

4,010,142

PURIFICATION OF ACRYLAMIDE VIA CRYSTALLIZATION WITH CENTRIFUGAL LIQUOR SEPARATION

John R. Hurlock, Hickory Hills, and Kenneth G. Phillips, River Forest, both of Ill., assignors to Nalco Chemical Company, Oak Brook, Ill.

Filed Dec. 15, 1975, Ser. No. 641,062

Int. Cl.² C07C *103/133*

U.S. Cl. 260—561 N **7 Claims**

1. A method for purifying an aqueous solution of acrylamide from organic impurities produced by the catalytic hydration of acrylonitrile to acrylamide which comprises:

a. concentrating said aqueous solution by vacuum stripping in the range >25° C to 50° C to produce an acrylamide concentration of about 80 percent;

b. cooling to about 25° C to produce a slurry of acrylamide crystals;

c. centrifuging said acrylamide crystals to express mother liquor and to produce a crystal cake of acrylamide;

d. washing crystal cake with water wash to produce an aqueous rinse liquor; and

e. recycling the mother liquor and aqueous rinse liquor to the vacuum stripping, step (a), for *n* times where *n* = 4–20.

4,010,143

MOLDING COMPOUND CONTAINING N-METHYL-Z PYRROLIDONE AND METHOD

Dervin L. Flowers, Scottsdale, Ariz., assignor to Motorola, Inc., Chicago, Ill.

Filed Dec. 26, 1973, Ser. No. 428,472

Int. Cl.² C08G *30/06*

U.S. Cl. 260—59 EP **2 Claims**

2. A molding compound consisting essentially of 0.1 to 10 percent N-methyl-2-pyrrolidone and the balance a semiconductor molding resin selected from the group consisting of epoxy, phenolic and silicone resin.

4,010,144

FLAME RETARDANT PHOSPHATE ESTER DERIVATIVES OF ORTHO NOVOLAKS

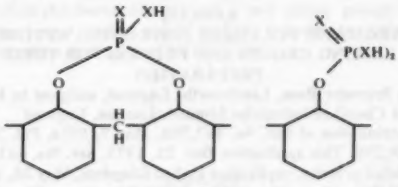
Bobby F. Dannels, and Alvin F. Shepard, both of Grand Island, N.Y., assignors to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Continuation-in-part of Ser. No. 451,670, March 13, 1974, abandoned. This application Dec. 3, 1975, Ser. No. 637,338

Int. Cl.² C08G *12/44*

U.S. Cl. 260—59 R **11 Claims**

1. A novolak resin wherein at least 90% of the alkylidene linkage is ortho to ortho and at least 25% of the phenolic hydroxyl groups are esterified and which comprises the following moieties:



wherein X is selected from the group consisting of O or S.

5. The method of producing a flame-retardant polymer which comprises the step of esterifying a novolak resin containing at least 90% of the alkylidene linkage as ortho to ortho with a member selected from the group consisting of P_4O_6, P_2O_3, P_2O_5 or mixtures thereof to provide the novolak resins of claim 1.

4,010,145

PROCESS AND CATALYST INHIBITOR SYSTEMS FOR PREPARING SYNTHETIC LINEAR POLYESTERS

Nicholas C. Russin; Ronald A. Tershansy, and Charles J. Kibler, all of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 576,415, May 12, 1975, Pat. No. 3,962,189, and a continuation-in-part of Ser. No. 519,953, Nov. 1, 1974, abandoned. This application Mar. 1, 1976, Ser. No. 662,672

Claims priority, application Canada, Oct. 1, 1975, 236847; Germany, Oct. 30, 1975, 2548630; Italy, Oct. 30, 1975, 28846/75; Japan, Oct. 30, 1975, 50-130951; France, Oct. 31, 1975, 75.33316; United Kingdom, Oct. 31, 1975, 45353/75

Int. Cl.² C08G *63/14*

U.S. Cl. 260—75 R **22 Claims**

1. Process for producing poly(ethylene terephthalate) comprising reacting dimethyl terephthalate and ethylene glycol at a temperature sufficient to effect ester interchange and in the presence of a catalyst system comprising a mixture of salts of manganese and cobalt with a titanium alkoxide and an antimony compound, the manganese salts being present in the amount of about 25–110 ppm Mn, the cobalt salts being present in the amount of about 10–100 ppm Co, the titanium alkoxide being present in the amount of about 20–60 ppm Ti,

and the antimony compound being present in the amount of about 50–300 ppm Sb, all parts by weight based on the acid fraction of the polyester.

4,010,146

POLYOL BLENDS AND POLYURETHANE PREPARED THEREFROM

David D. Russell, Atwater, and George Shkapenko, Akron, both of Ohio, assignors to Samuel Moore and Company, Aurora, Ohio

Filed Sept. 29, 1975, Ser. No. 617,655
Int. Cl.² C08G *18/00*
U.S. Cl. 260—77.5 AM **7 Claims**

1. A thermoplastically processible polyurethane prepared by reacting an organic diisocyanate, a low molecular weight glycol chain extender having only primary hydroxyl groups and a blend of from about 5 to about 95 parts by weight per 100 parts of a block copolymer of ethylene oxide and 1,2-propylene oxide having the formula

$$HO[(C_2H_3 - O)_x(C_3H_6 - O)_y(C_2H_3 - O)_z]H$$

wherein x and z are integers of from 0 to 22 and y is an integer of from 1 to 20 and the molecular weight of the copolymer is between 500 and 3000 and the remainder poly(tetramethylene ether)glycol having a molecular weight of from about 500 to about 3000, said block copolymer containing from about 60 to about 100 percent primary hydroxyl groups.

4,010,147

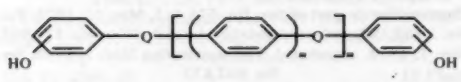
AROMATIC POLYMERS CONTAINING KETONE LINKING GROUPS AND PROCESS FOR THEIR PREPARATION

John Brewster Rose, Letchworth, England, assignor to Imperial Chemical Industries Limited, London, England

Continuation of Ser. No. 467,798, May 7, 1974, Pat. No. 3,928,295. This application Dec. 22, 1975, Ser. No. 643,082
Claims priority, application United Kingdom, May 25, 1973, 25202/73; May 25, 1973, 25205/73; June 22, 1973, 29682/73; Oct. 12, 1973, 47684/73; Dec. 20, 1973, 59060/73; Mar. 14, 1974, 11443/74
The portion of the term of this patent subsequent to Dec. 23, 1992, has been disclaimed.
Int. Cl.² C08G *2/00, 75/20*
U.S. Cl. 260—79.3 M **1 Claim**

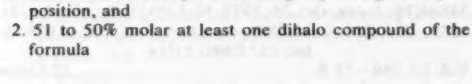
1. A process for the preparation of aromatic polymers having reduced viscosity of between 0.8 and 3.0, as measured at 25° C on a solution of polymer in concentrated sulphuric acid of density 1.84 g/cm³ containing 1 g of polymer in 100 cm³ of solution, which comprises heating at a temperature of 250° to 400° C a monomer mixture comprising

1. 49 to 50% molar of a di(alkali metal) salt of at least one bisphenol of the formula

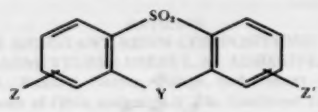


at least 95% of the phenolic OH groups being in the para position, and

2. 51 to 50% molar at least one dihalo compound of the formula



where Q is SO_2 or CO, X is F, Cl or Br, n is a positive integer not exceeding 3 and m is 0 or 1, and the molar percentages of said di(alkali metal) salt and said at least one dihalo compound sum to 100%, said di(alkali metal) salt being present as a suspension in a diaryl sulphone having the formula



in which Y is a direct link, an oxygen atom or two hydrogen atoms (one attached to each benzene ring) and Z and Z′ are selected from hydrogen atoms and phenyl groups and may be the same or different, the proportion of SO_2 to CO groups in the monomer mixture being not greater than 25%.

4,010,148

PURIFIED THYMOSIN AND PROCESS

Allan Leonard Goldstein, Galveston, Tex., assignor to Board of Regents of the University of Texas System, Galveston, Tex.

Filed May 12, 1975, Ser. No. 576,509
Int. Cl.² C07C *103/52;* **C07G** *7/00*
U.S. Cl. 260—112 R **9 Claims**

1. In a process for recovering a biologically active protein component from thymus tissue, said process comprising

i. homogenizing and extracting thymic tissue in aqueous saline solution, then centrifuging to remove undissolved material;

ii. heat treating the centrifuge supernatant at about 80° C., which treatment precipitates undesired fraction then centrifuging to remove the precipitated portions;

iii. admixing the supernatant with a large excess of cold acetone, thereby precipitating the active fraction, and collecting said precipitate;

iv. dissolving the acetone precipitate in phosphate buffer, then adding ammonium sulfate to about 25% of saturation and removing non-soluble impurity; and

v. increasing the ammonium sulfate content to about 50% of saturation, thereby precipitating the active fraction; the improvement which comprises in combination

A. dissolving the collected precipitate from step (v) in phosphate buffer and ultrafiltering the solution using a membrane having a molecular weight cut-off of 15,000;

B. concentrating the ultrafiltration filtrate and treating the residue by column chromatography to thereby separate salt and nucleotides;

C. isolating the protein peak from (B) and then additionally purifying the protein material by column chromatography followed by gel filtration and then gel electrophoresis.

4,010,149

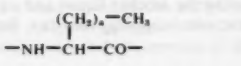
ANALOGS OF LH-RH AND PROCESS FOR PREPARING THE SAME

Yoshihiko Baba; Yutaka Okada; Hiroyashi Horikoshi, and Yuichiro Yabe, all of Tokyo, Japan, assignors to Sankyo Company Limited, Tokyo, Japan

Filed Apr. 7, 1975, Ser. No. 565,362
Claims priority, application Japan, Apr. 26, 1974, 49-48174
Int. Cl.² C07C *103/52;* **C07G** *7/00*
U.S. Cl. 260—112.5 LH **8 Claims**

1. A peptide having the formula N-Acetyl-N-methylglycyl-L-histidyl-L-tryptophyl-L-seryl-L-tyrosyl-Y-L-leucyl-L-arginyl-L-prolyl-Z

wherein Y is a D-α-alkylglycine residue of the formula



in which *n* is an integer of 0 through 3 inclusive and Z is ethylamino group or an ethylamino group which is substituted with 1 to 3 fluorine atoms at the 2-position.

4,010,150
RED COPPER COMPLEXES OF DISAZO COMPOUNDS CONTAINING TRIAZINE GROUPS

Tooru Tabei, Ohmiya; Yasuhiko Arisaka, Yono, and Yutaka Iizuka, Mitaka, all of Japan, assignors to Nippon Kayaku Kabushiki Kaisha, Tokyo, Japan

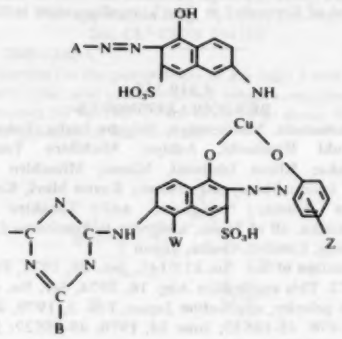
Filed Dec. 4, 1973, Ser. No. 421,581

Claims priority, application Japan, Dec. 6, 1972, 47-121694; Dec. 9, 1972, 47-123701; July 10, 1973, 48-77066; July 19, 1973, 48-82271

Int. Cl.² C09B *45/28, 62/08;* **D06P** *1/10, 3/60*

U.S. Cl. 260—146 T **13 Claims**

1. An azo dye having the following formula:



wherein

A is a group selected from 4-methoxy-2-sulfophenyl, 4-methoxy-3-sulfophenyl, 2- or 3-sulfophenyl, tolyl, 4-nitro-2,2'-disulfostilbyl, sulfonaphthyl and 4-(4-sulfophenylazo)-2-sulfophenyl;

B is selected from monoethanolamino, diethanolamino, morpholino, and N-methylamino;

W is hydrogen or sulfonic acid; and

Z is sulfonic acid attached at the meta or para position relative to the pendant diazo.

4,010,151
WATER INSOLUBLE MONO AZO AND DISAZO DYES CONTAINING CINNAMONITRILE GROUP

Claude Marie Henri Emile Brouard, Sotteville les Rouen; Jean Marie Louis Leroy, St. Etienne du Rouvray, and Jean-Pierre Henry Stiot, Saint Pierre les Elbeuf, all of France, assignors to Produits Chimiques Ugine Kuhlmann, St. Denis, France

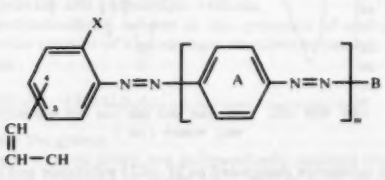
Continuation-in-part of Ser. No. 123,414, March 11, 1971, abandoned. This application Apr. 8, 1974, Ser. No. 459,147

Claims priority, application France, Mar. 12, 1970, 70.08829; Apr. 13, 1973, 73.13392

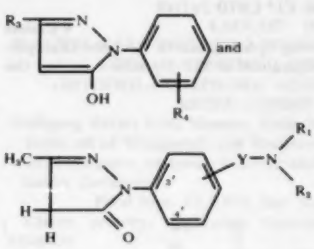
Int. Cl.² C09B *29/08, 29/36, 29/38, 33/12*

U.S. Cl. 260—160 **3 Claims**

1. A dyestuff of the formula:



in which —CH=CH—CN is fixed in the 4- or 5- position, X is hydrogen or chlorine, *m* is zero or one, the benzene nucleus A is unsubstituted or substituted by one chlorine, alkyl containing 1 to 4 carbon atoms, alkoxy containing 1 to 4 carbon atoms, acetylamino, propanoylamino, benzoylamino or cinnamoylamino, and B is selected from the group consisting of hydroxycarbazole, N-alkyl-4-hydroxy-2-quinolones with 1 to 4 carbon atoms in the alkyl group,



wherein Y is CO or SO_2, the group $-Y-NR_1R_2$ is fixed in the 3' or 4' position, R_1 is alkyl containing 1 to 4 carbon atoms, R_2 is hydrogen or alkyl containing 1 to 4 carbon atoms, R_3 is hydrogen, methyl, alkoxycarbonyl, carbonamide, N-alkyl-or N,N-dialkylcarbonamido, the alkyl and alkoxy groups containing 1 to 4 carbon atoms, and R_4 is hydrogen, chlorine, cyano, nitro, methyl or sulphonamido.

4,010,152
ALIPHATIC ALPHA-(HYDROPEROXY) AZO COMPOUNDS AND SALTS THEREOF

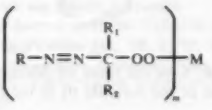
Ronald Edward MacLeay, Williamsville, and Chester Stephen Sheppard, Tonawanda, both of N.Y., assignors to Pennwalt Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 88,249, Nov. 9, 1970, abandoned, which is a continuation-in-part of Ser. No. 725,180, April 29, 1968, abandoned, which is a continuation-in-part of Ser. No. 616,158, Feb. 15, 1967, abandoned. This application Mar. 21, 1974, Ser. No. 453,445

Int. Cl.² C07C *107/02*

U.S. Cl. 260—192 **9 Claims**

1. A compound of the formula



where M is hydrogen, alkali metal or alkaline earth metal; m is the valence of M;

R is $C_1 - C_{12}$ alkyl, $C_3 - C_{12}$ cyclo-, bicyclo- or tricycloalkyl, or $C_7 - C_9$ aralkyl;

R_1 and R_2 are separately selected from hydrogen, $C_1 - C_8$ alkyl, $C_3 - C_{12}$ cyclo-, bicyclo- or tricycloalkyl, $C_7 - C_{12}$ aralkyl and, $C_6 - C_{14}$ aryl,

and R_1 and R_2 taken together form $C_3 - C_7$ alkylene; and one or more of each of R, R_1 and R_2 can be substituted with lower alkoxy, hydroxy, carboxy, lower alkoxycarbonyl, lower alkylcarbonyloxy, halogen, cyano, dimethylamido or lower alkylsulfonato.

4,010,153
PREPARATION OF CHIRAL 1,4-BENZODIAZEPIN-2-ONE-DERIVATIVES BY REACTION OF (S)-α-AMINO ACID CHLORIDE HYDROCHLORIDES ETC.

Franjo Kajfež, and Vitomir Šunjić, both of Chiasso, Switzerland, assignors to CRC Compagnia di Ricerca Chimica S.A., Chiasso, Switzerland

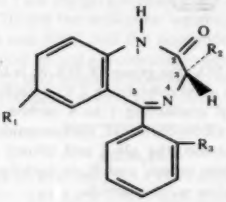
Filed July 29, 1974, Ser. No. 492,912

Claims priority, application Switzerland, July 30, 1973, 11056/73

Int. Cl.² C07D *243/48*

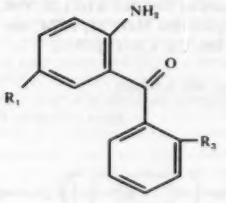
U.S. Cl. 260—239.3 D **9 Claims**

1. A process preparing optically active 1,4-benzodiazepin-2-ones with (S)-configuration in the 3-position having the formula I



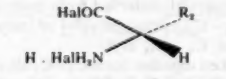
I

wherein R_1 is a hydrogen atom, or a halogen atom, R_2 is an n- or iso- lower alkyl radical with at most 4 carbon atoms, a benzyl, p-hydroxybenzyl, or 3'-methyleneindolyl group, R_3 is a hydrogen atom or a halogen atom, comprising the steps of (a) reacting, in an inert solvent selected from methylene chloride and tetrahydrofuran at about room temperature, a compound of the formula II



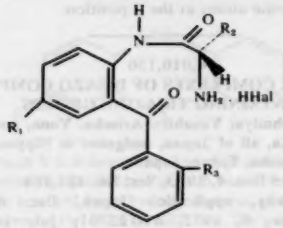
II

wherein R_1 and R_3 have the same significance as in Formula I with a compound of the formula III in the (S)-configuration



III

in which R_2 has the same significance as in Formula I and Hal is a halogen atom, whereby an intermediate compound of the formula IV in the (S)-configuration is formed, and



(IV)

(b) cyclizing said intermediate compound in an inert solvent selected from the group consisting of a homogeneous mixture of water and an organic solvent and non-polar organic solvents, at a temperature of up to about 40° C whereby the compound of Formula I.in the (S)-configuration is formed.

4,010,154
BENZODIAZEPINONES

Hisao Yamamoto, Nishinomiya; Shigeho Inaba, Takarazuka; Toshiyuki Hirohashi, Ashiya; Michihiro Yamamoto, Toyonaka; Kikuo Ishizumi, Minoo; Mitsuhiro Akatsu, Ikeda; Isamu Maruyama, Minoo; Kazuo Mori, Kobe; Yoshiharu Kume, Neyagawa, and Takahiro Izumi, Takarazuka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Continuation of Ser. No. 111,141, Jan. 29, 1971, Pat. No. 3,867,372. This application Aug. 16, 1974, Ser. No. 497,936

Claims priority, application Japan, Feb. 3, 1970, 45-9691; Feb. 5, 1970, 45-10533; June 24, 1970, 45-55529; June 24, 1970, 45-55530

Int. Cl.² C07D *243/20*

U.S. Cl. 260—239.3 D **7 Claims**

1. 1-(β-Methylsulfonylethyl)-5-phenyl-7-chloro-1,3-dihydro-2H-1,4-benzodiazepin-2-one.

4,010,155
ANTIBIOTIC SF-1623 SUBSTANCE

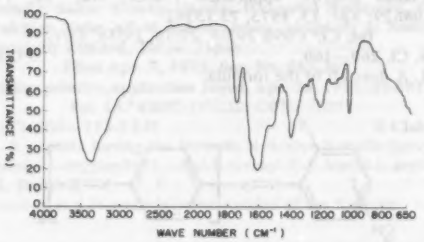
Shigeharu Inouye; Takashi Shomura, both of Yokohama; Michio Kojima, Tokyo; Yasuaki Ogawa, Yokohama; Hiroshi Watanabe, Yokohama; Yasumitsu Kondo, Yokohama, all of Japan; Kazuo Saito, deceased, late of Fujisawa, Japan (by Nobuko Saito, administratrix); Yujiro Yamada, and Taro Niida, both of Yokohama, Japan, assignors to Meiji Seika Kaisha, Ltd., Tokyo, Japan

Filed Nov. 25, 1974, Ser. No. 526,731

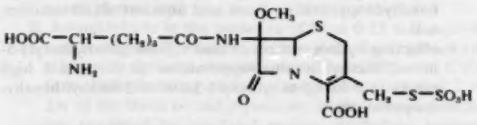
Claims priority, application Japan, Nov. 28, 1973, 48-132594

Int. Cl.² C07D *501/36;* **C12D** *9/00*

U.S. Cl. 260—243 C **5 Claims**



1. A substance designated as SF-1623 substance and identified as a compound of the formula:



and its non-toxic pharmaceutically acceptable salt.

4,010,156

PROCESS FOR THE REARRANGEMENT OF PENICILLINS TO CEPHALOSPORINS AND INTERMEDIATE COMPOUNDS THEREOF

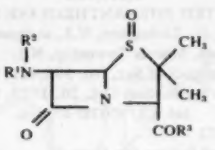
Abraham Nudelman, Bala Cynwyd, and Ronald J. McCaully, Malvern, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

Division of Ser. No. 352,850, April 19, 1973, Pat. No. 3,932,398. This application Aug. 7, 1975, Ser. No. 602,623

Int. Cl.² C07D *501/10*

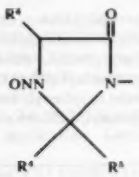
U.S. Cl. 260—243 C **7 Claims**

1. A process for the preparation of a 3-halo-3-methyl-cepham-4-carboxylic acid ester or amide which comprises heating from between 50° to 150° C. for from 10 to about 50 hours a penicillin sulfoxide of the formula



in which

R^1 is a member selected from the group consisting of acetyl, phenylacetyl, phenoxyacetyl, thiophenoxyacetyl, 2-thienylacetyl, tetrazolylacetyl, cyanoacetyl, sydnone-3-acetyl, pyridylthioacetyl, alpha-hydroxyphenylacetyl and alpha-hydroxy-2-thienylacetyl, R^2 represents hydrogen or a radical that in conjunction with R^1N forms a phthalimido radical, or

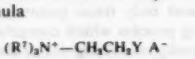


in which

R^4 and R^5 are hydrogen or a lower alkyl group and R^6 is phenyl or 1,4-cyclohexadienyl;

R^3 is a substituent selected from the group consisting of lower alkoxy, 2,2,2-trichloroethoxy, aryloxy of 6 to 10 carbon atoms, aralkoxy of 7 to 12 carbon atoms, alkoxyaralkoxy of 9 to 14 carbon atoms, mono- or di-lower alkylamino, arylamino of 6 to 10 carbon atoms, saccarimido and phthalimido radicals,

in a polyhaloalkane solvent in the presence of at least an equimolar amount of a quaternary ammonium catalyst of the formula



in which the groups

R^7, when taken alone, are independently selected from the group consisting of lower alkyl, aryl of 6 to 10 carbon atoms, aralkyl of 7 to 12 carbon atoms, and the three R^7 groups, when taken with the nitrogen atom to which they are attached form a pyridinyl, picolinyl, quinolinyl, isoquinolinyl or lutidinyl radical;

Y is a member selected from the group consisting of —Cl, —Br, —I, lower alkanoyloxy, lower thioalkanoyloxy, p-toluenesulfonyloxy, azido or a quaternary ammonium group, and

A is a member of the group consisting of Cl, —Br and —I.

4,010,157

O-ALKYL-S-[1,6-DIHYDRO-3-METHYL-6-OXO-PYRIDAZIN-(1)-YLMETHYL](THIONO)(DI)THIOL-PHOSPHORIC ACID ESTERS AND ESTER-AMIDES

Wolfgang Hofer; Fritz Maurer; Hans-Jochem Riebel; Lothar Rohe, all of Wuppertal, and Bernhard Homeyer, Opladen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

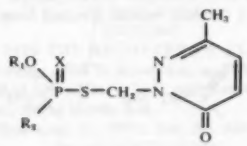
Filed Sept. 13, 1974, Ser. No. 505,801

Claims priority, application Germany, Sept. 28, 1973, 2348736

Int. Cl.² C07F *9/24*

U.S. Cl. 260—250 AP **6 Claims**

1. An S-[1,6-dihydro-3-methyl-6-oxo-pyridazin-(1)-ylmethyl]-(thiono)-(di)-thiol-phosphoric acid ester or ester-amide of the formula



in which

R_1 is alkyl with up to 6 carbon atoms,

R_2 is monoalkylamino, dialkylamino, alkenylamino or alkynylamino with up to 6 carbon atoms per alkyl, alkenyl or alkynyl moiety, and

X is oxygen or sulfur.

4,010,158

1-(2′-ETHYNYL-PHENOXY)-2-HYDROXY-3-BUTYLAMINO-PROPANES AND SALTS

Herbert Köppe; Karl Zeile; Werner Kummer; Helmut Stahle, all of Ingelheim am Rhein, and Albrecht Engelhardt, Mainz (Rhine), all of Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

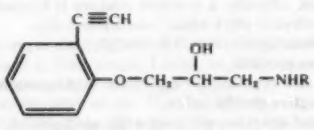
Continuation-in-part of Ser. No. 727,078, May 6, 1968, abandoned. This application Jan. 18, 1973, Ser. No. 324,844

Claims priority, application Germany, May 18, 1967, 92594

Int. Cl.² C07C *93/06;* **C07D** *473/00*

U.S. Cl. 260—253 **3 Claims**

1. A compound of the formula



wherein R is secondary butyl or tertiary butyl, or a non-toxic, pharmacologically acceptable acid addition salt thereof.

4,010,159
PYRROLO[3,4-D]PYRIMIDINES AND METHODS FOR THEIR PREPARATION

Giorgio Tarzia, Rome, and Gianbattista Panzone, Cornaredo (Milan), both of Italy, assignors to Gruppo Lepetit S.p.A., Milan, Italy

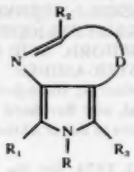
Filed Mar. 17, 1975, Ser. No. 559,192

Claims priority, application United Kingdom, Mar. 20, 1974, 12369/74

Int. Cl.² C07D *487/04*

U.S. Cl. 260—256.4 F **1 Claim**

1. Compound of formula



wherein:

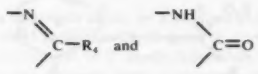
R represents hydrogen, (C_{1-4})alkyl, benzyl or chloro substituted benzyl;

R_1 stands for hydrogen, (C_{1-4})alkyl, phenyl, or phenyl substituted with methyl, ethyl, methoxy, hydroxy, chloro, fluoro or bromo;

R_2 may be hydrogen, (C_{1-4})alkyl, phenyl or amino;

R_3 is selected from hydrogen or (C_{1-4})alkyl;

D represents a divalent radical selected from the groups



wherein the carbon atoms are linked to the carbon atom of the pyrrole nucleus and R_4 represents hydroxy, (C_{1-4})alkyl or phenyl;

and a salt thereof with a pharmaceutically acceptable acid.

4,010,160
PROCESS FOR THE MANUFACTURE OF 1,3-BIS-(β-ETHYLHEXYL)-5-AMINO-5-METHYL-HEXAHYDROPYRIMIDINE

Fritz-Walter Lange, Gauting; Gert Haffner, Laupheim, and Jens Muller, Gauting, all of Germany, assignors to Meditest Institut fur Medizinisch Pharmazeutische Untersuchungen GmbH, Neu, Ulm, Germany

Filed Jan. 27, 1975, Ser. No. 544,217

Int. Cl.² C07D *239/04*

U.S. Cl. 260—256.4 H **5 Claims**

1. A process for the manufacture of high purity 1,3-bis-(β-ethylhexyl)-5-amino-5-methyl-hexahydropyrimidine comprising steps of:

a. providing a solution containing 1,3-bis-(β-ethylhexyl)-5-nitro-5-methyl-hexahydropyrimidine in a suitable solvent therefor;

b. adding naphthalene-1,5-disulphonic acid to said 1,3-bis-(β-ethylhexyl)-5-nitro-5-methyl-hexahydropyrimidine in said solution, whereby a reaction mixture is formed and 1,3-bis-(β-ethylhexyl)-5-nitro-5-methyl-hexahydropyrimidine-naphthalene-1,5-disulphonate is produced as a reaction product;

c. separating said reaction product from said reaction mixture by selective precipitation;

d. treating said reaction product with an aqueous alkali solution to effect conversion of said reaction product into 1,3-bis-(β-ethylhexyl)-5-nitro-5-methyl-hexahydropyrimidine;

e. separating said 1,3-bis-(β-ethylhexyl)-5-nitro-5-methyl-hexahydropyrimidine from said aqueous alkali solution; and

f. effecting hydrogenation of said 1,3-bis-(β-ethylhexyl)-5-nitro-5-methyl-hexahydropyrimidine to form said high purity 1,3-bis-(β-ethylhexyl)-5-amino-5-methyl-hexahydropyrimidine.

4,010,161
PIPERAZINOETHYL-N-(2,3-DIMETHYL-5-OXO-1-PHENYL-3Δ-PYRAZOLIN-4-YL)CARBAMATES

Don Pierre René Lucien Giudicelli, Fontenay-sous-Bois; Henry Najer; Bogdan Iliesco-Branceni, both of Paris; Philippe Michel Jacques Manoury, L'Hay-les-Roses, and Jean Louis Christian Binet, Ballainvillers, all of France, assignors to Synthelabo, Paris, France

Filed Dec. 20, 1974, Ser. No. 534,792

Claims priority, application France, Dec. 21, 1973, 73.45925

Int. Cl.² C07D *403/12*

U.S. Cl. 260—268 PH **5 Claims**

1. A compound which is 2-(4-m-chlorophenyl-piperazino)-ethyl N-(2,3-dimethyl-5-oxo-1-phenyl-3Δ -pyrazolin-4-yl)-carbamate or its tartrate.

4,010,162
SUBSTITUTED PHENANTHROLINE PIGMENTS

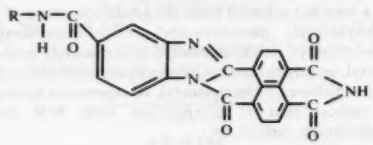
James J. Jordan, Jr., Livingston, N.J., assignor to Allied Chemical Corporation, Morris Township, N.J.

Continuation-in-part of Ser. No. 508,481, Sept. 23, 1974, abandoned. This application Oct. 20, 1975, Ser. No. 623,701

Int. Cl.² C07D *471/16*

U.S. Cl. 260—272 **19 Claims**

1. A compound having the formula



wherein R is phenyl, anthraquinonyl, chlorophenyl, dichlorophenyl, trichlorophenyl, methylphenyl, dimethylphenyl, trimethylphenyl, methoxyphenyl, dimethoxyphenyl, trimethoxyphenyl, (chloro)-(methyl)phenyl, (chloro)(methoxy)-phenyl, (chloro)(dimethoxy)phenyl, (methyl)(methoxy)phenyl, (methoxy)(nitro)phenyl, (chloro)(nitro)-phenyl or (methyl)(nitro)phenyl.

4,010,163
PHENOLIC RESINS

Wolfgang Hesse, Wiesbaden, and Paul Jacobi, Wiesbaden-Biebrich, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Germany

Filed Mar. 24, 1975, Ser. No. 561,339

Claims priority, application Germany, Mar. 23, 1974, 2414097

Int. Cl.² C08G *2/34*, *8/10*; C08L *61/10*

U.S. Cl. 260—29.3 **10 Claims**

7. A hardenable phenolic resin composition which is substantially free from unreacted phenol and unreacted formaldehyde and which liberates at most only trace quantities of formaldehyde during a hardening process which comprises a liquid phase selected from the group consisting of (a) a solution and (b) an aqueous emulsion of the reaction product of

A. a novolak wherein the molar ratio of phenol(s) to formaldehyde is from 1:0.1 to 1:0.8 containing methylene bridges, being not predominantly cross-linked in the

ortho-position and being substantially free from unreacted phenol with

B. formaldehyde in the presence of from 0.15 to 1 equivalent (based on the number of phenolic hydroxy groups) of a basic catalyst at a temperature of from 20° to 70° C the formaldehyde being added in an amount such that 2 to 2½ of the three o- and p-positions in the phenolic nuclei are occupied by methylol groups, methylene bridges, alkyl or other substituents.

4,010,164

N-(FURYL-METHYL)-2-HYDROXY-5,9,9-TRIMETHYL-BENZOMORPHANS AND SALTS THEREOF

Adolf Langbein; Herbert Merz; Gerhard Walther, and Klaus Stockhaus, all of Ingelheim, Rhine, Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim, Rhine, Germany,

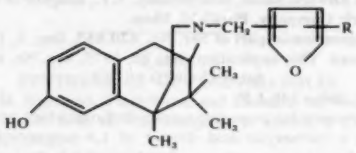
Continuation-in-part of Ser. No. 454,964, March 27, 1974, abandoned. This application July 28, 1975, Ser. No. 599,427

Claims priority, application Germany, Mar. 28, 1973, 2315339

Int. Cl.² C07D *405/06*

U.S. Cl. 260—293.54 **7 Claims**

1. An optically inactive or optically active compound of the formula



wherein R is hydrogen or methyl, or a non-toxic, pharmacologically acceptable acid addition salt thereof.

4,010,165

MANUFACTURE OF THIOPHEN-3-ALDEHYDE

Horst Koenig, and Ulrich Ohnsorge, both of Ludwigshafen, Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

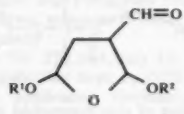
Filed Sept. 24, 1975, Ser. No. 616,447

Claims priority, application Germany, Oct. 3, 1976, 2447253

Int. Cl.² C07D *333/16*

U.S. Cl. 260—332.3 R **10 Claims**

1. A process for the manufacture of thiophen-3-aldehyde, which comprises reacting a 2,5-dialkoxy-3-formyl-tetrahydrofuran of the formula I



in which R^1 and R^2 may be identical or different and each is straight-chain or branched alkyl of 1 to 5 carbon atoms, with hydrogen sulfide in the presence of an acid whose pK in aqueous solution is at most 5.0 at elevated temperatures of from 50° to 320° C.

4,010,166

1,4-OXAZEPINES

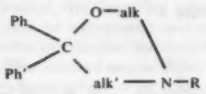
Robert Mathews Bowman, Summit, N.J., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 526,758, Nov. 25, 1974. This application Sept. 22, 1975, Ser. No. 615,255

Int. Cl.² C07D *267/10*

U.S. Cl. 260—333 **6 Claims**

1. A compound of the formula



wherein each of alk and alk′ is ethylene, R is lower alkyl, lower alkenyl, lower alkynyl, (lower cycloalkyl, lower cycloalkenyl or Ph)-$C_mH_{2(m-q)}$, (hydroxy, halogeno, amino, mono- or di-lower alkylamino)C_pH_{2p} or halogeno-C_pH_{2p-2}; each of Ph and Ph′ is phenyl, unsubstituted or substituted by up to three members of lower alkyl, lower alkoxy, lower alkylmercapto, hydroxy, halogeno or trifluoromethyl; m is an integer from 0 to 4; p such from 2 to 4; q such from 0 to 2 and $(m-q)$ is positive; or a therapeutically acceptable acid addition salt thereof.

4,010,167

METHOD FOR THE RECOVERY OF ZEARALENONE

Vernon V. Young; John S. Kosewicz, and Frederick William Schmitz, all of Terre Haute, Ind., assignors to IMC Chemical Group, Inc., Terre Haute, Ind.

Filed Aug. 22, 1975, Ser. No. 606,957

Int. Cl.² C07D *313/00*

U.S. Cl. 260—343.2 F **35 Claims**

1. A method for recovering zearalenone from an aqueous mixture including an aqueous phase and a solid phase, containing, in the solid phase, zearalenone and other undissolved solids, which comprises:

a. contacting the zearalenone with a zearalenone-selective aqueous solvent mixture consisting essentially of a water-miscible, organic solvent and water in amounts sufficient to selectively dissolve and transmit the zearalenone from the solid phase to the aqueous solvent phase and provide a pumpable zearalenone solution;

b. removing the undissolved solids from the zearalenone solution at a temperature sufficiently high to maintain the zearalenone in solution and sufficiently low to avoid dissolving the solids, thereby forming a clarified zearalenone solution;

c. increasing the proportion of water-to-water miscible, organic solvent in the clarified zearalenone solution to precipitate the zearalenone; and

d. separating the precipitated zearalenone from its mother liquor at a temperature at which zearalenone is substantially insoluble in its mother liquor.

4,010,168

NAPHTHALIDE INDICATOR DYES

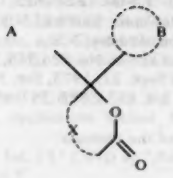
Richard B. Greenwald, Lexington, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Continuation of Ser. No. 204,350, Dec. 2, 1971, Pat. No. 3,862,128. This application Nov. 4, 1974, Ser. No. 520,247

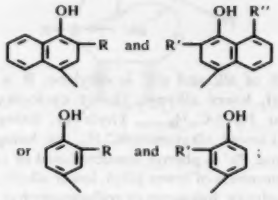
Int. Cl.² C07D *305/14*

U.S. Cl. 260—343.2 R **11 Claims**

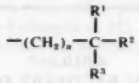
1. An indicator dye having the formula:



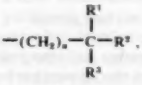
wherein A and B are



X represents the carbon atoms necessary to complete phthalide or naphthalide; R is the group



wherein R^1 is —OH, —SH or $—NH_2$, R^2 is hydrogen, alkyl having 1 to 20 carbon atoms, aryl selected from phenyl and naphthyl, alkaryl having 1 to 20 carbon atoms or perhalomethyl, R^1 and R^2 when taken together represent =O, R^3 is an electron-withdrawing group and n is an integer 0 or 1; and R′ and R″ each are selected from hydrogen, carboxy, hydroxy, o-hydroxyphenyl, sulfonamido, sulfamoyl and said group



at least one of said R′ and R″ being hydrogen.

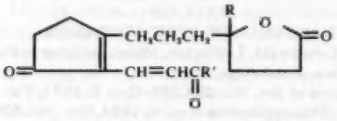
4,010,169

(E)-4-HYDROXY-11,15-DIOXOPROSTA-8(12),13-DIEN-1-OIC ACID γ-LACTONES

Leland J. Chinn, Morton Grove, and Karlene W. Salamon, Chicago, both of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Filed Mar. 10, 1976, Ser. No. 665,363
Int. Cl.² C07D *307/32*
U.S. Cl. 260—343.6 **5 Claims**

1. A compound of the formula



wherein R represents hydrogen, methyl, or ethyl and R′ represents alkyl containing more than 4 and fewer than 8 carbons.

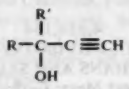
4,010,170

BUTENOLIDE SYNTHESIS VIA CARBONYLATION OF VINYLMERCURIALS

Richard Craig Larock, Ames, Iowa, assignor to Iowa State University Research Foundation, Inc., Ames, Iowa

Filed Sept. 24, 1975, Ser. No. 616,436
Int. Cl.² C07D *307/58*
U.S. Cl. 260—343.6 **11 Claims**

1. A method of preparing B-halobutenolide, and gamma substituted derivatives thereof, said method comprising, reacting a compound of the formula:



wherein R and R′ are organic moieties selected to represent the gamma substituents of the particular butenolide being prepared with a mercuric halide to provide a vinylmercuric halide, and carbonylating said vinylmercuric halide, in the presence of a carbonylating agent selected from the group consisting of noble metals and noble metal salts to provide B-halobutenolide or a gamma substituted derivative thereof.

4,010,171

PROCESS FOR PREPARING TETRAHYDROFURAN

William Edward Smith, Schenectady, N.Y., assignor to General Electric Company, Pittsfield, Mass.

Continuation-in-part of Ser. No. 420,853, Dec. 3, 1973, abandoned. This application Oct. 20, 1975, Ser. No. 623,905
Int. Cl.² C07D *307/08*
U.S. Cl. 260—346.1 R **3 Claims**

1. A process for preparing tetrahydrofuran which comprises heating a carboxylic acid diester of 1,4-butanediol in the vapor phase in the presence of water and a hydrolysis-dehydroacyloxylation catalyst selected from the group consisting of alumina, silica, silica-alumina, and silica-magnesia at a temperature in the range of from 200° C to about 325° C.

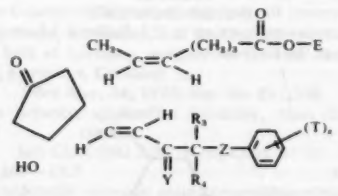
4,010,172

SUBSTITUTED KETO AND ALKOXY 16-PHENOXY AND 17-PHENYL PGE_2-TYPE COMPOUNDS

Walter Morozowich, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 523,568, Nov. 14, 1974. This application Nov. 21, 1975, Ser. No. 634,121
Int. Cl.² C07C *69/76*; C09B *11/10*
U.S. Cl. 260—390 **11 Claims**

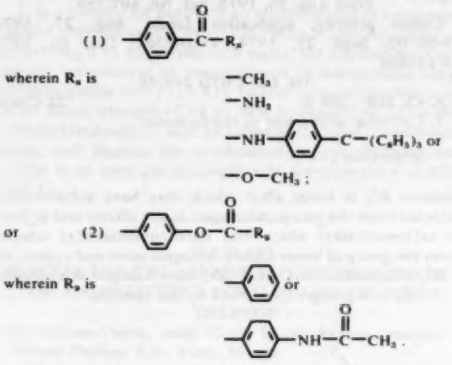
1. An optically active compound of the formula



or a racemic mixture of that compound and the enantiomer thereof, wherein R_3 and R_4 are hydrogen, methyl, or ethyl; T is alkyl of one to 4 carbon atoms, inclusive, fluoro, chloro, trifluoromethyl, or $-OR_5$, wherein R_5 is hydrogen or alkyl of one to 4 carbon atoms, inclusive, and s is zero, one, 2, or 3, with the proviso that not more than two T's are other than alkyl; Y is

H OH or H OH ;

and Z represents an oxa atom (—O—) or C_jH_{2j}, wherein C_jH_{2j} is a valence bond or alkylene of one to 9 carbon atoms, inclusive, substituted with zero, one, or 2 fluoro, with one to 6 carbon atoms, inclusive, between $-CR_3R_4-$ and the ring; and E is



4,010,173
SYNTHESIS OF 4-CYANOTHIAZOLES

George D. Hartman, Plainsboro, and Leonard M. Weinstock, Belle Mead, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Feb. 26, 1975, Ser. No. 553,185
Int. Cl.² C07D 277/28
U.S. Cl. 260—302 R 9 Claims

1. A method for the synthesis of a 4-cyanothiazole which comprises reacting in the presence of an acidic catalyst β,β-dichloro-α-amino-acrylonitrile with a compound of the formula

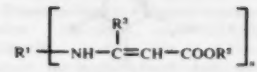
wherein R is hydrogen, straight or branched alkyl of form 1 to 10 carbon atoms, phenyl alkyl wherein the alkyl group is from 1 to 10 carbon atoms, phenyl or substituted phenyl wherein the substituent is methyl, F, Cl, Br, I or nitro, the acidic catalyst being hydrochloric acid, sulfuric acid, or p-toluene-sulfonic acid.

4,010,174
THIAZOLINONE-(2)-CARBOXYLIC ACID ESTERS AND PROCESS THEREFOR

Klaus Grohe, Cologne, and Paul-Ernst Frohberger, Leverkusen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Division of Ser. No. 271,104, July 12, 1972, Pat. No. 3,925,400. This application Sept. 5, 1975, Ser. No. 610,818
Claims priority, application Germany, July 28, 1971, 2137649
Int. Cl.² C07D 277/14
U.S. Cl. 260—306.7 R 7 Claims

1. Process for producing thiazolinone-(2)-carboxylic acid esters which comprises reacting chlorocarbonyl sulphenyl chloride having the formula COCl—SCl with a β-amino acrylic acid ester having the formula:



wherein,

n is 1 or 2 and, when *n* is 1,

R^1 is selected from the group of hydrogen, C_1 to C_{12}-alkyl, C_5 to C_6-cycloalkyl, the foregoing substituted by phenyl which may itself be substituted one or more times by fluorine, chlorine or bromine atoms or by C_1 to C_3-alkyl, phenyl, phenyl substituted one or more times by fluorine, chlorine or bromine atoms or by C_1 to C_3-alkyl,

and, when *n* is 2,

R^1 is a polymethylene group with from 2 to 6 carbon atoms or a meta- or para-phenylene group;

R^2 is selected from the group of C_1 to C_{12}-alkyl, C_5- or C_6-cycloalkyl, the foregoing substituted by one or more C_1 to C_3-alkoxy, nitrile or C_1 to C_3-alkoxy carbonyl groups or by a phenyl radical which is itself optionally substituted one or more times by fluorine, chlorine or bromine atoms or by C_1 to C_3-alkyl; and

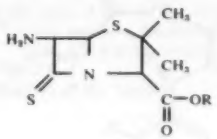
R^3 is the same as R^2 or is selected from the group of C_1-C_3-alkoxy carbonyl, phenyl, phenyl substituted one or more times by fluorine, chlorine or bromine atoms or by C_1 to C_3-alkyl.

4,010,175
THIO-β-LACTAM PENICILLINS

Christopher M. Cimarusti, Hamilton, N.J.; Paul Wojtkowski, Wilmington, Del., and Joseph E. Dolfini, Cincinnati, Ohio, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Division of Ser. No. 551,221, Feb. 19, 1975, Pat. No. 3,971,776. This application Apr. 5, 1976, Ser. No. 673,777
Int. Cl.² C07D 499/42
U.S. Cl. 260—306.7 C 2 Claims

1. A compound of the formula



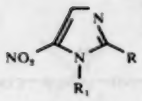
wherein R is hydrogen, lower alkyl, phenyl-lower alkyl, trihaloethyl, alkali metal or alkaline earth metal.

4,010,176
ISOXAZOLE SUBSTITUTED NITROIMIDAZOLES

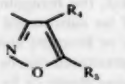
Peter Kulsa, Scotch Plains, N.J., and Clarence S. Rooney, Beaconsfield, Canada, assignors to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 301,420, Oct. 27, 1972, Pat. No. 3,915,978, and a continuation of Ser. No. 1,307, Jan. 7, 1970, Pat. No. 3,711,495. This application July 30, 1975, Ser. No. 600,252
Int. Cl.² C07D 413/04
U.S. Cl. 260—307 H 2 Claims

1. A 1,2-disubstituted 5-nitroimidazole having the following structure:



wherein R_1 is hydrogen, loweralkyl having 1 to 6 carbon atoms, or CH_2—CH_2-OH and R is



wherein R_4 and R_5 are the same or different and are each hydrogen, loweralkyl having 1–6 carbon atoms, carboxyalkyl, carboxamido, carboxamidoalkyl, carboxamidodialkyl, amino, phenyl, aminoalkyl, or aminodialkyl wherein the alkyl group is carboxyalkyl, carboxamidoalkyl, carboxamidodialkyl, aminoalkyl and aminodialkyl contains 1 to 6 carbon atoms; or R_4 and R_5 are a ring structure of:

$-(CH_2)_n$, n being an integar from 3–10;

provided that when only one of R_4 and R_5 are hydrogen, the substituent other than hydrogen is in the 5-position of the ring.

4,010,177

[3-SUBSTITUTED-5-[(DI-METHYLAMINO)METHYL]-4H-1,2,4-TRIAZOL-4-YL]BENZOPHENONES AND PROCESS

Martin Gall, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

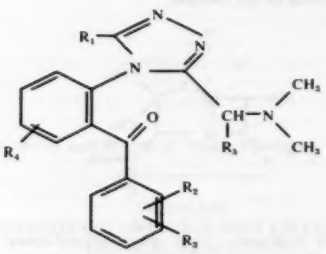
Filed June 6, 1975, Ser. No. 584,616

The portion of the term of this patent subsequent to Sept. 23, 1992, has been disclaimed.

Int. Cl.² C07D *249/08, 401/06, 403/06, 413/06*

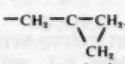
U.S. Cl. 260—308 R **14 Claims**

1. A compound of the formula I:



I

wherein R_1 is hydroxymethyl or $-CH_2NR_6R_7$, in which R_6 is $-CH_2$-C ≡ CH, $-CH_2$-CH=CH_2,



or alkyl of 1 to 3 carbon atoms inclusive, R_7 is hydrogen or alkyl of 1 to 3 carbon atoms, or together

is pyrrolidino, piperidino, or morpholino, wherein R_2 is hydrogen, chlorine or fluorine; wherein R_3 is hydrogen or fluorine if R_2 is fluorine; wherein R_4 is fluorine, chlorine, bromine, nitro, or trifluoromethyl; and wherein R_5 is hydrogen, methyl or ethyl, and the pharmacologically acceptable acid addition salts thereof.

4,010,178

CARBONIC ACID ESTERS, AND THE PREPARATION THEREOF AND THEIR USE

Takashi Kamiya, Suita; Masumi Itoh, Takatsuki, and Daijiro Hagiwara, Ikeda, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

Filed Aug. 26, 1975, Ser. No. 607,759

Claims priority, application Japan, Aug. 27, 1974, 49-98702; Sept. 21, 1974, 49-109362; Oct. 10, 1974, 49-115856

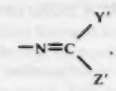
Int. Cl.² C07D *249/18*

U.S. Cl. 260—308 B **22 Claims**

1. Carbonic acid esters of the formula:

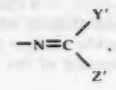
wherein R'_1 is lower alkyl which may have substituent(s) selected from the group of halogen, lower alkoxy and aryloxy, or ar(lower)-alkyl which may have substituent(s) selected from the group of lower alkoxy, halogen, nitro and cyano, and

R'_2 is benzotriazolyl which may have halogen as a substituent; or a group represented by the formula:



wherein Y′ and Z′ are each cyano, nitro, carbamoyl, esterified carboxy, lower alkanoyl, aroyl or disubstituted carbamoyl; provided that when

R'_2 is a group represented by the formula:



wherein Y′ and Z′ are each cyano, nitro, carbamoyl or esterified carboxy,

R'_1 is ar(lower)alkyl having substituent(s) selected from the group of lower alkoxy, halogen, nitro and cyano.

4,010,179

1-(PARA-SUBSTITUTED-PHENYL)-1H-TETRAZOLES

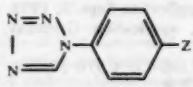
William Vincent Curran, Pearl River, N.Y.; Andrew Stephen Tomcufcik, Old Tappan, N.J., and Adma Schneller Ross, Suffern, N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 470,083, May 15, 1974, abandoned. This application Nov. 10, 1975, Ser. No. 630,563

Int. Cl.² C07D *257/04*

U.S. Cl. 260—308 D **7 Claims**

1. A compound of the formula:



wherein Z is selected from the group consisting of fluoromethylthio, difluoromethylthio, fluoromethylsulfinyl, difluoromethylsulfinyl, fluoromethylsulfonyl and difluoromethylsulfonyl.

4,010,180
PROCESS FOR THE PURIFICATION OF COPPER PHTHALOCYANINE

Siegfried Schiessler, Frankfurt am Main; Ernst Spietschka, Oberauroff, Taunus, and Wolfgang Tronich, Frankfurt am Main, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Dec. 21, 1973, Ser. No. 427,316

Claims priority, application Germany, Dec. 22, 1972, 2262895

Int. Cl.² C09B *47/04*

U.S. Cl. 260—314.5 **6 Claims**

1. In a process for purifying an unsubstituted or halogenated copper phthalocyanine by transforming it into its sulfate and recovering it by hydrolysis with water, the improvement comprising: introducing an unsubstituted or halogenated copper phthalocyanine into (1) a 4 to 10-fold amount of sulfuric acid of an initial strength of 84 to 88% by weight, or (2) a more concentrated sulfuric acid and diluting it to said concentration range, and heating the so-obtained copper phthalocyanine sulfate in an inert gas atmosphere to a temperature of 60° to 100° C.

4,010,181
PROCESS FOR THE ASYMMETRIC HYDROGENATION OF A SUBSTITUTED ACRYLIC ACID OR ESTER THEREOF

Paul Aviron-Violet, Saint Genis Laval, France, assignor to Rhone-Poulenc S.A., Paris, France

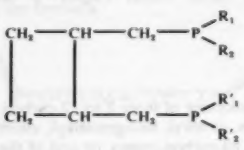
Division of Ser. No. 470,866, May 17, 1974, Pat. No. 3,949,000. This application June 25, 1975, Ser. No. 590,091

Claims priority, application France, May 21, 1973, 73.18319

Int. Cl.² C07B *1/00*

U.S. Cl. 260—326.14 T **3 Claims**

1. A process for the asymmetric hydrogenation of a substituted acrylic acid or ester thereof, which comprises hydrogenating a mixture of the said acid or ester and a rhodium complex in which the rhodium is bound to halogen and a diphosphine of the formula:



in which the phosphinomethyl groups are in the trans-position relative to one another, and the radicals R_1, R_2, R'_1 and R'_2, which may be identical or different, each represent straight or branched alkyl of 1 to 8 carbon atoms, cycloalkyl of 5 or 6 ring carbon atoms, or aryl consisting of one or more benzene rings which are bonded to one another by a valency bond or which form with one another an ortho- or peri-condensed system, the said aryl being unsubstituted or substituted by straight or branched alkyl of 1 to 4 carbon atoms.

4,010,182
METHOD FOR PRODUCING N-(4-FLUOROPHENYL)-2,3,-DICHLOROMALEIMIDE

Kazuo Matsui, Fujisawa; Taichiro Shigematsu, Machida; Tetsuya Shibahara, Kawasaki, and Makoto Nakazawa, Yokohama, all of Japan, assignors to Mitsubishi Chemical Industries Ltd., Tokyo, Japan

Filed May 7, 1975, Ser. No. 575,389

Claims priority, application Japan, May 15, 1974, 49-53978

Int. Cl.² C07D *207/44*

U.S. Cl. 260—326.5 FM **6 Claims**

1. In a process for the preparation of N-(4-fluorophenyl)-2,3-dichloromaleimide by reaction of a first reactant selected from the group consisting of 2,3-dichloromaleic acid, 2,3-dichloromaleic anhydride and esters of 2,3-dichloromaleic acid with 4-fluoroaniline as a second reactant or by dehydrative-cyclization reaction of N-(4-fluorophenyl)-2,3-dichloromaleamic acid or 4-fluoroanilinium-2,3-dichloromaleate, the improvement characterized by conducting the reaction in water.

4,010,183
ANHYDROUS SOLVENT SEPARATION IN PRODUCTION OF POLYOL MONOACYLATES

Camilo Quesada, Parma Heights, Ohio, assignor to SCM Corporation, New York, N.Y.

Filed Mar. 28, 1975, Ser. No. 563,130

Int. Cl.² C11B *7/00*

U.S. Cl. 260—428.5 **9 Claims**

1. In a process for separating crystallizable C_3 polyol monoacylates having $C_{8\text{-}36}$ acyl groups from a feed mixture thereof with related polyol polyacylates by fractionally crystallizing said monoacylate as a crystal crop from a solution of said feed mixture in fugitive aprotic solvent therefor, the improvement for substantially precluding degradation of said cropped monoacylate which comprises:

a. restricting said solvent to one having no hydroxyl groups;

b. melting said crystal crop; and

c. subjecting the resulting melt to a stripping operation under reduced pressure and anhydrous conditions at a temperature not substantially above about 150° C. until there is virtually no solvent residual in said melt, at least the final phase of said stripping being performed with inert gas sparging of said melt.

4,010,184
THIENODIAZEPINES

Michio Nakanishi, Nakatso; Kazuhiko Araki, Yoshitomi; Tetsuya Tahara, Yoshitomi, and Masami Shiroki, Yoshitomi, all of Japan, assignors to Yoshitomi Pharmaceutical Industries, Ltd., Osaka, Japan

Filed Mar. 20, 1974, Ser. No. 453,117

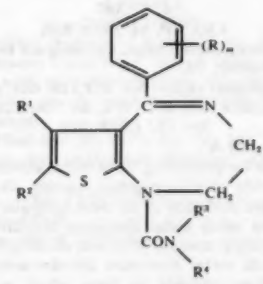
Claims priority, application Japan, Mar. 20, 1973, 48-32159; Apr. 18, 1973, 48-44423

The portion of the term of this patent subsequent to Oct. 8, 1991, has been disclaimed.

Int. Cl.² C07D *333/24*

U.S. Cl. 260—332.2 R **9 Claims**

1. Thienodiazepines of the formula:



wherein R is a halogen atom; each of R^1 and R^2 is a hydrogen atom or an alkyl group having 1 to 4 carbon atoms; each of R^3 and R^4 is an alkyl group having 1 to 4 carbon atoms; and *m* is an integer of one or two; and pharmaceutically acceptable acid addition salts thereof.

4,010,185

STABLE OIL-SOLUBLE METAL SULFONATE ANALYTICAL STANDARDS

William L. Groves, Jr., Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.

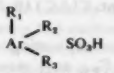
Filed May 22, 1975, Ser. No. 579,761
Int. Cl.² C07F 3/12
U.S. Cl. 260—433 4 Claims

1. A stable oil soluble metal sulfonate analytical standard prepared by sequentially reacting

a. an alkyl diamine compound represented by the structural formula R-NH-$(CH_2)_3$-NH_2 wherein R is an alkyl group containing from about 10 to 18 carbon atoms;

b. an inert diluent;

c. an alkyl substituted aryl sulfonic acid having the structural formula



wherein Ar is an aryl group, R_1 is hydrogen or an alkyl group containing from about 1 to 4 carbon atoms and R_2 and R_3 are alkyl groups containing from about 10 to 18 carbon atoms each;

d. carbon disulfide; and

e. an organic metal acetate wherein the metal is selected from the group consisting of mercury, vanadium, iron, lead, barium, beryllium, tin, silver, titanium, copper, magnesium, and sodium.

4,010,186

REMOVAL OF LEAD FROM AQUEOUS SOLUTION USING METALLIC MAGNESIUM

Thorowgood T. Broun, Jr., Beaumont, Tex., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Apr. 5, 1971, Ser. No. 131,548
Int. Cl.² C07F 7/24
U.S. Cl. 260—437 R 12 Claims

1. A method of reducing the dissolved organic lead content of aqueous solution resulting from manufacture of alkyllead compound, said aqueous solution containing contaminating quantities of dissolved organic lead and having a pH of from 7 to 11, comprising contacting said solution with at least 0.50 moles of metallic magnesium per mole of dissolved organic lead, said solution containing at least 0.1 weight percent added chloride ions, for a period of time sufficient to produce lead compounds that are insoluble in said solution, and separating insoluble lead compounds from the aqueous solution, thereby providing an aqueous solution containing substantially reduced levels of dissolved organic lead.

4,010,187

CHEMICAL PROCESS

Gunner E. Nelson, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Continuation-in-part of Ser. No. 512,120, Oct. 4, 1974. This application Nov. 20, 1974, Ser. No. 525,500
Int. Cl.² C07F 5/06
U.S. Cl. 260—448 A 40 Claims

1. A process for producing alkali metal aluminum dihydrocarbon dihydride which comprises reacting alkali metal and hydrogen in the presence of an inert aromatic hydrocarbon solvent for the alkali metal aluminum dihydrocarbon dihydride and a catalytic amount of at least about 0.001 percent by weight of alkali metal aluminum dihydrocarbon dihydride, under conditions suitable to form alkali metal hydride, thereby producing alkali metal hydride, and then reacting the alkali metal hydride with trihydrocarbon aluminum, aluminum and hydrogen, in the presence of said solvent under conditions suitable to form alkali metal aluminum dihydrocarbon dihydride thereby producing alkali metal aluminum dihydrocarbon dihydride.

4,010,188

CATALYTIC CONVERSION OF SATURATED HYDROCARBONS TO UNSATURATED PRODUCTS BY OXIDATION IN THE PRESENCE OF A HALOGEN

Robert K. Grasselli, Warrensville Heights, and Robert C. Miller, Northfield, both of Ohio, assignors to Standard Oil Company, Cleveland, Ohio

Filed June 24, 1968, Ser. No. 739,166
Int. Cl.² C07C 120/14
U.S. Cl. 260—465 C 9 Claims

1. A process for the production of acrylonitrile or methacrylonitrile wherein a hydrocarbon consisting essentially of propane or isobutane is reacted with ammonia and a molecular oxygen containing gas, at a temperature of 250° C to 800° C, in the presence of an ammoxidation catalyst and a minor quantity of a halogen containing component wherein said ammoxidation catalyst is antimony oxide in combination with at least one other metal oxide selected from the group consisting of tin oxide, uranium oxide or manganese oxide and wherein said halogen component consists essentially of at least one of Cl_2, Br_2, I_2, HCl, HBr, HI, NH_4Cl, NH_4Br, NH_4I, a lower alkyl chloride, a lower alkyl bromide or a lower alkyl iodide.

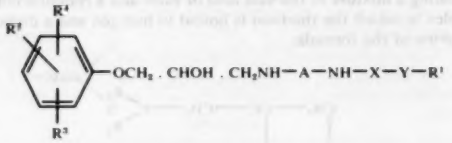
4,010,189

ALKANOLAMINE DERIVATIVES

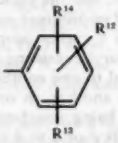
Leslie Harold Smith, Macclesfield, England, assignor to Imperial Chemical Industries Limited, London, England

Division of Ser. No. 421,669, Dec. 4, 1973, Pat. No. 3,928,412.
This application Aug. 26, 1975, Ser. No. 607,995
Claims priority, application United Kingdom, Dec. 15, 1972, 57970/72; Sept. 17, 1973, 43478/73
Int. Cl.² C07C 103/82, 121/80, 125/06
U.S. Cl. 260—465 D 14 Claims

1. An alkanolamine selected from compounds of the formula:



wherein A is alkylene of from 2 to 12 carbon atoms, wherein R^1 is hydrogen, or alkyl, halogenoalkyl, alkenyl or cycloalkyl each of up to 10 carbon atoms, or aryl of the formula:



wherein R^2, R^3, R^{12} and R^{13}, which may be the same of different, each is hydrogen, halogen, hydroxy, amino, nitro or cyano, alkyl, cycloalkyl, alkenyl, alkynyl, alkoxy, alkylthio, cycloalkoxy, alkenyloxy, alkynyloxy or alkanoyl each of up to 6 carbon atoms, or aryl, aryloxy or aralkoxy each of up to 12 carbon atoms; or wherein R^2 and R^3 together, and/or R^{12} and R^{13} together, are trimethylene, tetramethylene, 1-oxotetramethylene, propenylene, but-2-enylene or buta-1,3-dienylene such that together with two adjacent carbon atoms of the benzene ring they form respectively indanyl, 5,6,7,8- tetrahydronaphthyl, 5-oxo-5,6,7,8-tetrahydronaphthyl, indenyl, 5,8-dihydronaphthyl or naphthyl; wherein R^4 is hydrogen, hydroxy or hydroxymethyl or aralkoxy of up to 12 carbon atoms;

wherein R^{14} is hydrogen, amino or dialkylamino of up to 12 carbon atoms; wherein X is carbonyl (-CO-) and wherein Y is a direct link, or alkylene, oxyalkylene or alkyleneoxy each of up to 6 carbon atoms, or except when R^1 is hydrogen is oxygen; and the acid-addition salts thereof.

4,010,190

PRECURSORS FOR INSECTICIDES

Royston H. Davis; Derek A. Wood; Herbert P. Rosinger, all of Sittingbourne, and Ronald F. Mason, Ashford, all of England, assignors to Shell Oil Company, Houston, Tex.

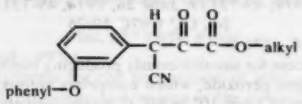
Filed Apr. 30, 1976, Ser. No. 681,939

Claims priority, application United Kingdom, May 2, 1975, 18438/75

Int. Cl.² C07C *121/66*

U.S. Cl. 260—465 D **2 Claims**

1. A compound of the formula



wherein the alkyl moiety contains from one to six carbon atoms.

4,010,191

ACYL DERIVATIVES OF SUBSTITUTED BIS-ARYLALKYLAMINO COMPOUNDS

Kurt Thiele, Barcelona, Spain; Walter Von Bebenburg, Frankfurt, and Klaus Posselt, Bergen-Enkheim, both of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt (Main), Germany

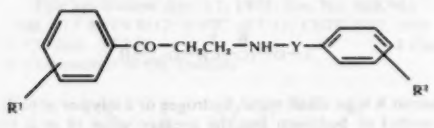
Continuation of Ser. No. 128,623, Dec. 17, 1970, abandoned. This application Dec. 14, 1973, Ser. No. 424,835

Claims priority, application Austria, Dec. 18, 1969, 787/69

Int. Cl.² C07C *103/44*, *103/64*, *103/82*, *125/00*

U.S. Cl. 260—471 C **7 Claims**

1. A compound selected from the group consisting of compounds having the formula



in which R^1 is an acetamino, ethoxycarbonylamino, phenoxycarbonylamino, β,β-dimethylacrylylamino, cinnamylamino, 4-methylcinnamylamino, chlorocinnamylamino, methoxycinnamylamino, or α-methylcinnamylamino radical, R^2 is a hydrogen, methyl, hydroxyl, methoxy, fluoro, or chloro radical, and Y is a 1-methyl-2-hydroxyethylene or 1-ethyl-2-hydroxyethylene radical, and pharmaceutically acceptable salt of these compounds and optically active isomers and diastereoisomers thereof.

4,010,192

5-OXA PHENYL- AND PHENOXY-SUBSTITUTED PROSTAGLANDIN E_1 ANALOGS

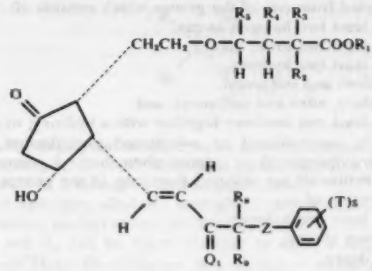
Norman A. Nelson, Galesburg, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Continuation of Ser. No. 524,952, Nov. 18, 1974, abandoned, which is a division of Ser. No. 361,990, May 21, 1973, Pat. No. 3,864,387. This application Feb. 23, 1976, Ser. No. 660,214

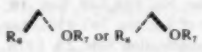
Int. Cl.² C07C *69/76*

U.S. Cl. 260—473 G **17 Claims**

1. An optically active compound of the formula



or a racemic compound of that formula and the mirror image thereof, wherein Z represents an oxa atom (—O—or C_jH_{2j} wherein C_jH_{2j} is a valence bond or alkylene of one to 9 carbon atoms, inclusive, substituted with zero, one, or 2 fluoro, with one to 6 carbon atoms, inclusive, between $—CR_8R_9—$ and the ring; wherein T is alkyl of one to 4 carbon atoms, inclusive, fluoro, chloro, trifluoromethyl, or $—OR_{10}$, wherein R_{10} is hydrogen or alkyl of one to 4 carbon atoms, inclusive, and s is zero, one, 2, or 3, with the proviso that not more than two T's are other than alkyl and when s is 2 or 3 the T's are either the same or different; wherein Q_1 is



wherein R_6 and R_7 are hydrogen or alkyl of one to 4 carbon atoms, inclusive, being the same or different; wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with one, 2, or 3 chloro or alkyl of one to 4 carbon atoms, inclusive; wherein when Z is oxa (—O—), R_8 and R_9 are hydrogen or alkyl of one to 4 carbon atoms, being the same or different, and, when Z is C_jH_{2j}, R_8 and R_9 are hydrogen, alkyl of one to 4 carbon atoms, inclusive, or fluoro, being the same or different, with the proviso that R_9 is fluoro only when R_8 is hydrogen or fluoro; wherein R_3 is hydrogen, alkyl of one to 4 carbon atoms, inclusive, or fluoro; wherein R_2 is hydrogen or fluoro, with the proviso that R_2 is fluoro only when R_3 is hydrogen or fluoro; and wherein R_4 and R_5 are hydrogen or alkyl of one to 4 carbon atoms, inclusive, being the same or different, with the proviso that no more than one of R_3, R_4, and R_5 is alkyl; including the lower alkanoates thereof, and the pharmacologically acceptable salts thereof when R_1 is hydrogen.

4,010,193

BASIC ESTER

Kálmán Harsányi, Budapest; László Szekeres, Szeged; Gergely Héja, Budapest; Gyula Papp, Szeged; Dezsó Korbonits, and Pál Kiss, both of Budapest, all of Hungary, assignors to Chinoin Gyogyszer-es Vegyeszeti Termekek Gyara RT, Budapest, Hungary

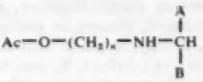
Filed Apr. 26, 1973, Ser. No. 354,732

Claims priority, application Hungary, Apr. 28, 1972, CI1231

Int. Cl.² C07C *93/24*, *93/20*

U.S. Cl. 260—473 R **4 Claims**

1. A compound of the formula:



wherein:

Ac is substituted benzoyl wherein the substituents are selected from one of the groups which consists of:
at least two halogen atoms,
at least two lower alkoxy,
at least two hydroxy,
chloro and sulfamoyl,
chloro, nitro and sulfamoyl, and
at least one methoxy together with a hydroxy; or

Ac is unsubstituted or substituted phenylacetyl, beta-phenylpropionyl or gamma-phenylbutyryl wherein the substituents are selected from one of the groups which consists of:
at least one halogen,
lower alkoxy,
hydroxy,
nitro,
sulfamoyl, and
nitro and sulfamoyl;

n is an integer of from 2 to 4; and

A and B together with the carbon atom to which they are attached form a cycloalkyl ring having from 3 to 7 carbon atoms.

4,010,194
5-OXA PHENYL- AND PHENOXY-SUBSTITUTED PROSTAGLANDIN A_1 ANALOGS

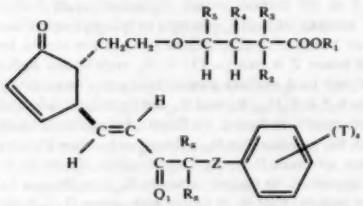
Norman A. Nelson, Galesburg, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Continuation of Ser. No. 524,549, Nov. 18, 1974, abandoned, which is a division of Ser. No. 361,990, May 21, 1973, Pat. No. 3,864,387. This application Feb. 23, 1976, Ser. No. 660,273

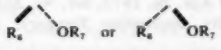
Int. Cl.² C07C *69/76*

U.S. Cl. 260—473 G **17 Claims**

1. An optically active compound of the formula



or a racemic compound of that formula and the mirror image thereof, wherein Z represents an oxa atom (—O—) or C_jH_{2j} wherein C_jH_{2j} is a valence bond or alkylene of one to 9 carbon atoms, inclusive, substituted with zero, one, or 2 fluoro, with one to 6 carbon atoms, inclusive, between $—CR_aR_a—$ and the ring; wherein T is alkyl of one to 4 carbon atoms, inclusive, fluoro, chloro, trifluoromethyl, or $—OR_{10}$, wherein R_{10} is hydrogen or alkyl of one to 4 carbon atoms, inclusive, and s is zero, one, 2, or 3, with the proviso that not more than two T's are other than alkyl and when s is 2 or 3 the T's are either the same or different; wherein Q_1 is



wherein R_6 and R_7 are hydrogen or alkyl of one to 4 carbon atoms, inclusive, being the same or different; wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with one, 2, or 3 chloro or alkyl of one to 4 carbon atoms, inclusive; wherein when Z is oxa (—O—), R_a and R_a are hydrogen or alkyl of one to 4 carbon atoms, being the same or different, and, when Z is C_jH_{2j}, R_a and R_a are hydrogen, alkyl of one to 4 carbon atoms, inclusive, or fluoro, being the same or different, with the proviso that R_a is fluoro only when R_4 is hydrogen or fluoro; wherein R_3 is hydrogen, alkyl of one to 4 carbon atoms, inclusive, or fluoro; wherein R_2 is hydrogen or fluoro, with the proviso that R_2 is fluoro only when R_3 is hydrogen or fluoro; and wherein R_4 and R_5 are hydrogen or alkyl of one to 4 carbon atoms, inclusive, being the same or different, with the proviso that no more than one of R_3, R_4, and R_5 is alkyl; including the lower alkanoates thereof, and the pharmacologically acceptable salts thereof when R_1 is hydrogen.

4,010,195
PROCESS FOR PRODUCING METHYL P-TOLUATE

Nobuo Isogai; Takashi Okawa, and Takako Takeda, all of Niigata, Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan

Division of Ser. No. 562,805, March 27, 1975, Pat. No. 3,981,909. This application Jan. 12, 1976, Ser. No. 648,027

Claims priority, application Japan, Apr. 8, 1974, 49-40799; June 26, 1974, 49-73119; June 26, 1974, 49-73120

Int. Cl.² C07C *69/76*

U.S. Cl. 260—476 R **5 Claims**

1. A process for simultaneously producing methyl p-toluate and hydrogen peroxide, which comprises autooxidizing at a temperature of from 10° to 50° C p-tolualdehyde containing less than 300 ppm of aromatic hydrocarbons, less than 200 ppm of non-aromatic hydrocarbons, less than 300 ppm of high boiling point substances and less than 5 ppm of acidic substances in a form of solution having a concentration of 10 to 50% by weight in acetone or ethyl acetate as a solvent with a gas containing molecular oxygen under a pressure of 1 to 60 kg/cm² in the absence of catalyst, thereby producing per-p-toluic acid, and reacting the resulting per-p-toluic acid with methanol in the presence of an esterification catalyst at a temperature of from 50° to 100° C.

4,010,196
LINEAR POLYESTER SALTS

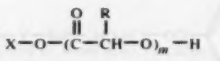
Andrew G. Tsuk, Plattsburg, N.Y., assignor to American Home Products Corporation, New York, N.Y.

Filed June 25, 1975, Ser. No. 590,357

Int. Cl.² C07L *69/66*

U.S. Cl. 260—484 A **4 Claims**

1. Polyester salts having the formula:



wherein X is an alkali metal, hydrogen or a mixture of both; R is methyl or hydrogen and the average value of m is from about 3 to about 30 with the proviso that at least 20% of X is an alkali metal and at least 20% of R is methyl.

4,010,197
PROCESS FOR PRODUCING DIACETOXYBUTANES AND BUTANEDIOLS

Jun Toriya, and Ken Shiraga, both of Kurashiki, Japan, assignors to Mitsubishi Chemical Industries Ltd., Japan

Filed Aug. 25, 1975, Ser. No. 607,482

Claims priority, application Japan, Sept. 2, 1974, 49-100778

Int. Cl.² C07C *29/00, 67/28*

U.S. Cl. 260—491 **9 Claims**

1. In a process for producing a diacetoxybutane by hydrogenating a diacetoxybutene compound in the presence of a supported hydrogenation catalyst, the improvement which comprises,

introducing said compound and hydrogen into a first reaction zone having said hydrogenation catalyst in a fixed bed therein, hydrogenating said compound under adiabatic conditions at a first temperature of 50° to 150° C to form a first reaction product,

dividing said reaction product into a first portion and a second portion, cooling said first portion, recirculating said first portion to said first zone to maintain said first temperature,

introducing said second portion and hydrogen into a second reaction zone having said hydrogenation catalyst in a fixed bed therein, further hydrogenating said second portion at a second temperature higher than said first temperature and up to 200° C.

4,010,198
PROCESS FOR THE PREPARATION OF ALLYL ACETATE

Günter Roscher, Kelkheim, Taunus, and Heinz Schmitz, Frankfurt am Main, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Continuation of Ser. No. 167,182, July 29, 1971, abandoned. This application Oct. 3, 1974, Ser. No. 511,677

Claims priority, application Germany, July 31, 1970, 2038120

Int. Cl.² C07C *67/04*

U.S. Cl. 260—497 A **3 Claims**

1. In a process for the preparation of allyl acetate from acetic acid, propylene and oxygen in the presence of carbon dioxide wherein a vapor phase mixture of said components is reacted, in a reaction zone, over a catalyst consisting essentially of

a. a metal or salt of a metal selected from the group consisting of palladium, platinum, ruthenium, rhodium and iridium;

b. an alkali metal or alkaline earth metal salt; and

c. a support for said components (a) and (b) selected from the group consisting of silicic acid, aluminum oxide and aluminum silicate, the improvement which comprises: reacting a mixture of said components in said reaction zone in which the concentration of propylene is below 50 percent by volume and propane is present in an amount of from 0.2 to 5.0 times that of propylene.

4,010,199
MITICIDAL DITHIOBIURETS

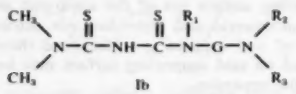
Russell F. Bellina, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 358,394, May 8, 1973, Pat. No. 3,890,322. This application Apr. 17, 1975, Ser. No. 568,903

Int. Cl.² A01N *9/12*; **C07C** *157/13*; **C07F** *3/02*, *3/06*

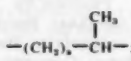
U.S. Cl. 260—552 R **4 Claims**

1. Compounds of the formula



Ib

G is $-(CH_2)_m-$ or



m is 0 through 6;

n is 1 or 2;

R_1 is methyl, $-(CH_2)_2-NR_2R_3$ or $-(CH_2)_3-NR_2R_3$;

R_2 is methyl or ethyl;

R_3 is alkyl of 1 through 6 carbon atoms;

with the provision that the sum of carbon atoms in G, R_1, R_2, and R_3 is not more than 10; and

salts of these compounds with acids or bases, the acids being selected from those having an ionization constant of at least 1×10^{-7} and the salts formed with bases containing the cation selected from Li^+, Na^+, K^+, Ca^{++}, Cu^{++}, Zn^{++}, Mg^{++}, Mn^{++}, and

where

R_4, R_5, and R_6 can be the same or different and each can be hydrogen, alkyl of 1 through 4 carbon atoms, or hydroxy alkyl of 2 through 4 carbon atoms; and

R_7 is hydrogen, alkyl of 1 through 12 carbon atoms, benzyl, amino, methyl amino, or dimethylamino;

R_4 and R_5 can be taken together to form a ring that is $-(CH_2)_2-O-(CH_2)_2-$ or $-(CH_2)_j-$ where j is 4–6 and R_6 and R_7 are H.

4,010,200
N,N-DIARYL ALKYLENEDIAMINE OXIDATION DYE COMPOUNDS

Gregoire Kalopissis, Paris, and Andree Bugaut, Boulogne-sur-Seine, both of France, assignors to Societe Anonyme dite: L'Oreal, Paris, France

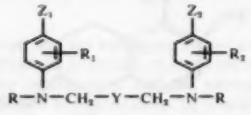
Continuation of Ser. No. 277,035, Aug. 1, 1972, abandoned, which is a division of Ser. No. 846,577, July 31, 1969, Pat. No. 3,694,138. This application Dec. 5, 1974, Ser. No. 529,922

Claims priority, application Luxembourg, Aug. 2, 1968, 56631

Int. Cl.² C07C *91/28*

U.S. Cl. 260—570.5 P **6 Claims**

1. A dye compound base for dyeing live human hair, said compound having the formula



wherein Z_1 is selected from the group consisting of $-NH_2$, $-NHCH_3$ and $-OH$, Z_2 is selected from the group consisting of $-NH_2$ and $-NHCH_3$, R_1 and R_2 each independently are selected from the group consisting of hydrogen and methyl, R is selected from the group consisting of hydrogen, hydroxyethyl and diethylaminoethyl with R being diethylaminoethyl when Z_1 and Z_2 are both $-NH_2$ and Y is $-(CH_2)_n-$ wherein n is 0 or 2; and the salt of said compound with an acid selected from the group consisting of hydrochloric and hydrobromic acids.

4,010,201
ORGANIC COMPOUNDS

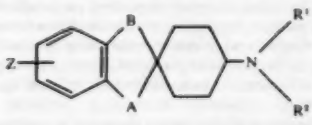
Daniel Lednicer, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 460,449, April 12, 1974, Pat. No. 3,932,425. This application Oct. 16, 1975, Ser. No. 623,172

Int. Cl.² C07C *97/10*

U.S. Cl. 260—570.5 CA **3 Claims**

1. A compound of the formula



wherein the sum of A and B is an integer of from 2 to 8; A is $-(C_nH_{2n-2}XY)-$ wherein X is hydroxy, and Y is hydrogen, and X, when taken together with Y, is selected from the group

consisting of =O and $=CR^3R^4$ wherein R^3 and R^4 are selected from the group consisting of hydrogen and lower alkyl of 1 through 3 carbon atoms; B is absent or $-(CH_2)_n-$ wherein *n* is 1 through 3; R^1 is selected from the group consisting of hydrogen and lower alkyl of 1 through 3 carbon atoms; R^2 is

$$-(CH_2)_nC(=O)Ar$$

wherein *n* is 2 through 5 and Ar is phenyl having zero through three substituents selected from the group consisting of lower alkyl of 1 through 3 carbon atoms, lower alkoxy of 1 through 3 carbon atoms, bromine, chlorine and fluorine; Z is selected from the group consisting of hydrogen, lower alkyl of 1 through 3 carbon atoms, lower alkoxy of 1 through 3 carbon atoms, nitro, bromine, chlorine and fluorine; and a pharmacologically acceptable acid addition salt thereof.

4,010,202

5,6-DIHYDROXY AMINOTETRALOL COMPOUNDS

Hirosada Sugihara; Masazumi Watanabe, both of Osaka; Michio Motohashi, Kobe; Masao Nishikawa, Kyoto, and Yasushi Sanno, Osaka, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

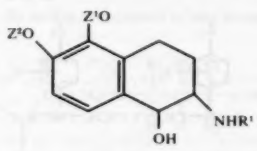
Filed Mar. 4, 1975, Ser. No. 555,128

Claims priority, application Japan, Apr. 25, 1974, 49-47211

Int. Cl.² C07C *91/06, 91/42, 93/14;* **A61K** *31/135*

U.S. Cl. 260—573 **23 Claims**

1. A compound of the formula



wherein each of Z^1 and Z^2 is hydrogen or alkyl of 1–6 carbon atoms and R^1 is (1) cycloalkyl of 3–7 carbon atoms or (2) alkyl of 1–6 carbon atoms substituted by (a) unsubstituted cycloalkyl of 3–7 carbon atoms, (b) cycloalkyl of 3–7 carbon atoms substituted by alkyl of 1–4 carbon atoms, hydroxyl, alkoxy of 1–4 carbon atoms or halogen, (c) hydroxyl, (d) alkoxy of 1–4 carbon atoms or (e) halogen,
or a pharmaceutically acceptable salt thereof.

4,010,203

ADHESIVE-APPLYING APPARATUS

Norman N. Aylon, Willowdale, Canada, assignor to General Concrete of Canada Limited, Hamilton, Canada

Division of Ser. No. 454,792, March 26, 1974, Pat. No. 3,928,114. This application Dec. 3, 1975, Ser. No. 637,198

Int. Cl.² B65C *11/04*

U.S. Cl. 156—578 **5 Claims**

1. An apparatus for the application of adhesive to building blocks comprising:

a substantially horizontal planar supporting surface,

an upright frame member extending perpendicularly of the plane of said supporting surface and to one side thereof,

a transverse frame member extending substantially transverse to but vertically spaced from said supporting surface substantially perpendicularly of said upright frame member,

first adhesive applying means mounted to said upright frame member and vertically movable relative thereto between said supporting surface and said transverse frame member for applying adhesive to selected portions of one side face of a building block on said supporting surface,

said first adhesive applying means comprising a first pair of nozzles spaced apart slightly less than the width of the side face of the building block,

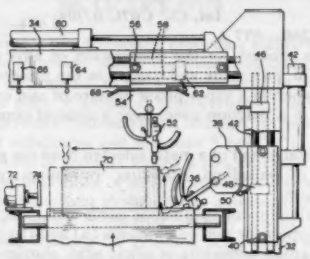
second adhesive applying means mounted to said transverse frame member and movable longitudinally thereof towards and away from said upright frame member for applying adhesive to selected portions of the top face of a building block on said supporting surface,

said second adhesive applying means comprising a second pair of nozzles spaced apart slightly less than the width of the top face of the building block,

first pneumatically controlled means for reciprocation of said first pair of nozzles through the height of said block,

second pneumatically controlled means for reciprocation of said second pair of nozzles through the length of said top face,

holding means for holding said building block on said supporting surface for application of adhesive thereto, said holding means comprising a stop member disposed adjacent said upright frame member and a movable pusher plate disposed on the opposite transverse side of said supporting surface from said stop member and cooperating with said stop member to apply lateral pressure to a block on said supporting surface to grip said block therebetween, and



removable stop means located at the downstream end of said supporting surface to prevent discharge of a building block from said apparatus until adhesive has been applied thereto,

said stop means including a vertically disposed plate and movable between a first position wherein it extends from the underside of said supporting surface to a position projecting above the plane of said supporting surface and thereby preventing movement of a block situated on the supporting surface out of the apparatus and a second position wherein said plate does not extend above the plane of said supporting surface and thereby a block situated on said supporting surface may be discharged from the apparatus.

4,010,204

PROCESS FOR PREPARING CONDENSATION PRODUCTS

Roland Köster, and Ali-Akbar Pourzal, both of Mulheim (Ruhr), Germany, assignors to Studiengesellschaft Kohle m.b.H., Mulheim (Ruhr), Germany

Continuation-in-part of Ser. No. 523,285, Nov. 13, 1974, abandoned. This application Nov. 13, 1974, Ser. No. 523,283

Int. Cl.² C07C *45/00;* **C07B** *5/02*

U.S. Cl. 260—586 C **8 Claims**

1. In the aldol condensation reaction wherein a ketone or aldehyde group having an alpha methylene group is reacted with a ketone or aldehyde group to form an alpha-, beta-unsaturated ketone or aldehyde, the improvement which comprises carrying out said reaction in the presence of a dialkyl boryl carboxylate of the formula:

$$R_2^V BOCOR^{IV}$$

wherein
R^{IV} is C_1–C_6 hydrocarbon and
R^V is each C_1–C_4 alkyl.

4,010,205
PROCESS FOR THE PREPARATION OF A DIKETONE DERIVATIVE

Joseph J. Becker, Geneva; Karl-Heinrich Schulte-Elte, Onex Geneva; Hugo Strickler, Dardagny Geneva, and Gunther Ohloff, Bernex Geneva, all of Switzerland, assignors to Firmenich S.A., Geneva, Switzerland

Filed Nov. 26, 1974, Ser. No. 527,450

Claims priority, application Switzerland, Dec. 7, 1973, 17172/73

Int. Cl.² C07C *27/00*, *45/00*

U.S. Cl. 260—586 P **1 Claim**

1. A process for the preparation of 2,2,6-trimethylcyclohex-5-en-1,4-dione which comprises oxidizing, in a heterogeneous phase, 3,3,5-trimethyl-cyclohex-4-en-1-one by means of oxygen or an oxygen containing gas mixture, in the presence of a metal catalyst selected from the organic acid salts of a transition metal or copper which has been deposited on an inert solid support selected from silicon dioxide, carbon, magnesium or calcium carbonate or hydrogen-carbonate, and a diatomaceous earth.

4,010,206
METHOD FOR PRODUCING CYCLOHEXANONE AND ALKYL-SUBSTITUTED OR UNSUBSTITUTED PHENOL

Ichiro Mikami, Chiba; Sadao Danno, Ichihara; Izuhiko Uchida, Ichihara; Yasutaka Tasaki, Ichihara; Junichi Kugimoto, Ichihara, and Satoru Fujitsu, Yamaguchi, all of Japan, assignors to UBE Industries, Ltd., Ube, Japan

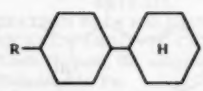
Filed Jan. 22, 1976, Ser. No. 651,455

Claims priority, application Japan, Jan. 31, 1975, 50-12349

Int. Cl.² C07C *27/12*, *37/00*, *45/02*

U.S. Cl. 260—586 P **18 Claims**

1. A method for producing cyclohexanone and alkyl-substituted or unsubstituted phenol, comprising oxidizing, in the liquid phase, an alkyl-substituted or unsubstituted phenylcyclohexane of the formula (I):



(I)

wherein R represents either a hydrogen atom or a methyl radical by bringing an oxidizing gas containing molecular oxygen into contact with alkyl-substituted or unsubstituted phenylcyclohexane in the presense of hydrogen bromide, and isolating the resultant cyclohexanone and alkyl-substituted or unsubstituted phenol from the oxidation mixture.

4,010,207
PROCESS FOR THE ALKYLATION OF α, β-UNSATURATED ALDEHYDES

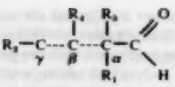
John B. Hall, Rumson, and Wilhelmus Johannen Wiegers, Red Bank, both of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Filed Jan. 15, 1976, Ser. No. 649,552

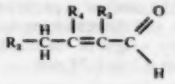
Int. Cl.² C07C *47/20*

U.S. Cl. 260—601 R **7 Claims**

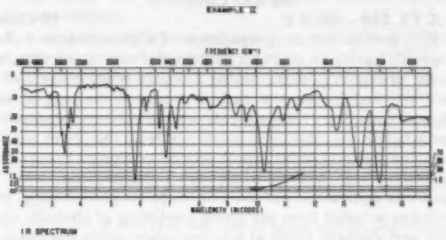
1. A process for preparing at least one aldehyde represented by the structure:



comprising the step of intimately admixing a halide having the structure R_1X wherein X is chloro with an unsaturated aldehyde having the structure:

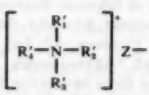


in the presence of an alkali metal hydroxide, an inert solvent and a "phase transfer agent", wherein one of the dashed lines is a double bond and the other of the dashed lines is a single bond; wherein R_1 is prenyl or benzyl, R_2 is methyl, n-propyl, 4-methyl-3-pentenyl or n-hexyl, and R_3 and R_4 are each the



I.R. SPECTRUM

same or different and are hydrogen, methyl or ethyl with the proviso that when R_3 is methyl or ethyl the dashed line between the beta carbon atom and the gamma carbon atom represents a double bond and when R_3 is hydrogen, either of the dashed lines is a double bond; said phase transfer agent having the structure:



wherein at least one of the groups R'_1, R'_2, R'_3 and R'_4 is C_6–C_{14} alkaryl or C_6–C_{20} alkenyl, and the other of R'_1, R'_2, R'_3 and R'_4 is C_1–C_8 alkyl, and Z represents halogen, the temperature of the reaction being in the range of from about 10° up to about 150° C, the mole ratio of unsaturated aldehyde:halide being from 0.5:1.5 up to about 1.5:0.5, the mole ratio of alkali metal hydroxide:halide being from about 0.75:1 up to about 1.5:1 and the concentration of "phase transfer agent" in grams per mole of unsaturated aldehyde being from 0.5 up to 25.

4,010,208
PRODUCTION OF FORMALDEHYDE

Albrecht Aicher, Frankenthal; Hans Haas, Ludwigshafen; Heinrich Sperber, Ludwigshafen; Hans Diem, Ludwigshafen; Guenther Matthias, Ludwigshafen, and Gunter Lehmann, Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Apr. 25, 1974, Ser. No. 464,182

Claims priority, application Germany, May 5, 1973, 2322757

Int. Cl.² C07C *45/02*

U.S. Cl. 260—603 HF **10 Claims**

1. In a process for the production of formaldehyde by oxidative dehydrogenation of methanol vapor with oxygen gas in

the presence of a silver catalyst at elevated temperature, the improvement which comprises carrying out the reaction by passing the reacting methanol and oxygen gases downwardly through a layered catalyst bed having a total catalyst thickness of from 15 to 35 mm. the catalyst bed being maintained in three superimposed portions, each of which consist of one or more layers of catalyst particles differing in size from layer to layer, with the proviso that the lower portion contains from 72.5 to 89% by weight of the catalyst as particles of a particle size of from 1 to 2.5 mm. the central portion contains 2.5 to 7.5% by weight of the catalyst as particles of a particle size of from 0.75 to 1 mm. and the remaining upper portion contains from 8.5 to 20% by weight of the catalyst as particles of a particle size of from 0.2 to 0.75 mm.

4,010,209

PROCESS

Curtis P. Smith, Cheshire, and Henri Ulrich, Northford, both of Conn., assignors to The Upjohn Company, Kalamazoo, Mich.

Filed Dec. 15, 1975, Ser. No. 640,716

Int. Cl.² C07F 9/53

U.S. Cl. 260—606.5 P **13 Claims**

1. A process for the preparation of a phospholene-1-chalcogenide having an aliphatic hydrocarbyl substituent attached to the phosphorus atom, having a double bond in the 2-or 3-position, and having the carbon atoms in the ring of said phospholene free of substituents other than inert substituents, and wherein the chalcogen is selected from the group consisting of oxygen and sulfur, which process comprises reacting the corresponding 1-(2-chloroalkoxy)-3-phospholene with at least one equivalent, per mole of the latter phospholene, of a member selected from the group consisting of aliphatic alcohols and aliphatic thiols at a temperature within the range of about −20° to about 160° C.

4,010,210

METHOD OF PREPARING AROMATIC AND HETEROCYCLIC SULPHIDES AND DISULPHIDES

Mikhail Grigorievich Voronkov, ulitsa Lermontova, 315, kv. 32; Eleonora Nikolaevna Deryagina, ulitsa Lermontova, 313a, kv. 79, both of Irkutsk; Evgeny Andreevich Chernyshev, Leninsky prospekt, 61/1, kv. 54; Valentina Ivanovna Savushkina, ulitsa Vavilova, 12, kv. 19, both of Moscow; Anatoly Samuilovich Nakhmanovich, Rossiiskaya ulitsa, 6, kv. 26, Irkutsk, and Bella Moiseevna Tabenko, ulitsa Metallurgov, 48, korpus 5, kv. 49, Moscow, all of U.S.S.R.

Filed Apr. 29, 1975, Ser. No. 572,850

Int. Cl.² C07C 149/00

U.S. Cl. 260—609 D **5 Claims**

1. A method of preparing aryl sulphides and disulphides, comprising reacting a bromoaryl compound with hydrogen sulphide in the liquid phase at a temperature of about from 200° C. to 300° C. by bubbling the hydrogen sulphide through a solution of the bromine compound in a high boiling solvent which is inert with respect to the hydrogen solphide, and isolating the reaction product.

4,010,211

STABILIZATION OF POLYETHER POLYOLS

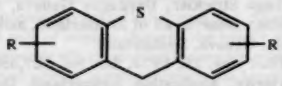
Frank J. Preston, Meriden, and Peter P. Priga, Oxford, both of Conn., assignors to Olin Corporation, New Haven, Conn.

Filed May 12, 1975, Ser. No. 576,839

Int. Cl.² C07C 41/12

U.S. Cl. 260—611.5 **6 Claims**

1. In a polyether polyol composition which is stabilized against degradation by the inclusion therein of about 500–10,000 parts per million by weight of a mixture of (1) about 15–75 percent by weight of 2,6-di-tertiarybutyl-4-methyl phenol and (2) correspondingly about 85–25 percent by weight of p,p'-dioctyl diphenyl amine, said polyether polyol having a molecular weight of about 250–8,000 and being the product of reacting a polyhydric alcohol having 2–8 hydroxy groups with an alkylene oxide having a 1,2-epoxide ring and selected from the group consisting of ethylene oxide, propylene oxide, butylene oxide and a mixture thereof, the improvement of including in said composition, as a partial replacement for said 2,6-di-tertiarybutyl-4-methyl phenol, about 25–600 parts, per million parts by weight of said polyether polyol, of a phenothiazine compound represented by the formula:



in which each R is independently hydrogen or alkyl of 1–12 carbon atoms.

4,010,212

PERFLUOROTERTIARYALKYL ETHERS

Frank J. Pavlik, West St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St.Paul, Minn.

Division of Ser. No. 32,477, April 13, 1970, Pat. No. 3,981,928, which is a division of Ser. No. 538,556, March 30, 1966, abandoned, which is a continuation-in-part of Ser. No. 246,022, Dec. 20, 1962, abandoned, which is a continuation-in-part of Ser. No. 234,222, Oct. 30, 1962, Pat. No. 3,385,904. This application June 14, 1976, Ser. No. 695,901

Int. Cl.² C07C 43/12

U.S. Cl. 260—615 F **2 Claims**

1. 3(perfluoro-tertiary-butoxy)dihydroxy propanol-1,2.

4,010,213

NOVEL ODORANTS

Peter Naegeli, Wettingen, Switzerland, assignor to Givaudan Corporation, Clifton, N.J.

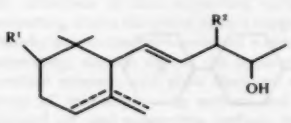
Filed Apr. 17, 1975, Ser. No. 569,121

Claims priority, application Switzerland, Mar. 25, 1975, 5752/75

Int. Cl.² C07C 31/13

U.S. Cl. 260—617 R **6 Claims**

1. Alcohols of the general formula:



(1)

wherein R^1 represents a hydrogen atom or a methyl group and R^2 represents a C_{1-6} alkyl group and wherein one of the two additional bonds indicated by dots may be present.

4,010,214

PROCESS FOR THE PREPARATION OF 2,5-DICHLORO-P-XYLENE

Samuel Gelfand, Lewiston, N.Y., assignor to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Filed Feb. 4, 1975, Ser. No. 547,067

Int. Cl.² C07C 25/02

U.S. Cl. 260—650 R **7 Claims**

1. A process for the preparation of 2,5-dichloro-p-xylene comprising the steps of:

A. reacting p-xylene with chlorine at a temperature of about 0° to about 100° Celsius in the presence of about 0.1 to about 1.0 percent by weight, based on the weight of p-xylene, of a catalyst system comprising a catalyst selected from the group consisting of $FeCl_2$, $FeCl_3$, $FeBr_3$,

$SbCl_3$, $SbCl_5$, SbOCl and $SbBr_3$ and a co-catalyst selected from the group consisting of dialkyl sulfides, diaryl sulfides, alkylaryl sulfides and cyclic sulfides, said catalyst and co-catalyst being present in a molar proportion of catalyst: co-catalyst of about 1:4 to about 1:1, to form a crude 2,5-dichloro-p-xylene product; and

B. mixing said crude product, in the liquid phase, with about 0.5 to about 5.0 parts by weight of isopropanol, per part of crude product, to remove by solution the soluble portions thereof; and

C. recovering therefrom, as a solid, insoluble product, a purified 2,5-dichloro-p-xylene product.

4,010,215
PROCESS FOR THE PREPARATION OF TRICHLOROETHYLENE

René Clair, Savigny-sur-Orge, and Yves Correia, Saint-Auban, both of France, assignors to Produits Chimiques Pechiney-Saint Gobain, Neuilly-sur-Seine, France

Filed Feb. 13, 1970, Ser. No. 11,118

Claims priority, application France, Feb. 21, 1969, 69.04472

Int. Cl.² C07C *21/00*

U.S. Cl. 260—654 D **18 Claims**

1. A process of preparing trichloroethylene from 1,1,1,2-tetrachloroethane comprising continuously introducing 1,1,1,2-tetrachloroethane in the liquid state into a metallic walled reaction zone, decomposing said 1,1,1,2-tetrachloroethane under a pressure within the range of 3 to 6 bars and at a temperature within the range of 135° to 250° C to maintain in ebullition the liquid phase containing 1,1,1,2-tetrachloroethane introduced into said reaction zone.

4,010,216
CODIMERIZATION PROCESS USING A SUPPORTED NICKEL CARBONYL CATALYST

Jin Sun Yoo, South Holland, Ill., assignor to Atlantic Richfield Company, Philadelphia, Pa.

Division of Ser. No. 314,147, Dec. 11, 1972, Pat. No. 3,907,923, which is a division of Ser. No. 49.968, June 25, 1970, Pat. No. 3,725,306. This application Apr. 14, 1975, Ser. No. 568,211

Int. Cl.² C07C *11/12*, *3/10*

U.S. Cl. 260—680 R **18 Claims**

1. In a process for the codimerization of alphaolefins of 2 to 10 carbon atoms and 1,3-conjugated dienes of 4 to about 12 carbon atoms, the improvement which comprises conducting the polymerization in contact with a catalytically effective amount of a catalyst composition comprising:

a. a minor, catalytically effective amount of a nickel complex of the formula

$$(L)_mNi(CO)_n$$

wherein L is a tertiary, hydrocarbyl-substituted monodentate ligand of a Group V-A element, *m* is an integer having a value from 1 to 3 and *n* is an integer having a value of 1 to 4 the sum of *m* and *n* being 4; and

b. a major amount of an acidic, solid, silica-based support material as an essential catalyst component.

4,010,217
OLEFIN CONVERSION

Ernest A. Zuech, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Continuation of Ser. No. 267,998, June 30, 1972, abandoned, which is a division of Ser. No. 73,231, Sept. 17, 1970, Pat. No. 3,691,144, which is a division of Ser. No. 717,023, March 28, 1968, Pat. No. 3,558,518, which is a continuation-in-part of Ser. No. 694,873, Jan. 2, 1968, abandoned, and Ser. No. 635,700, May 3, 1967, abandoned. This application Feb. 10, 1975, Ser. No. 548,582

Int. Cl.² C07C *3/62*

U.S. Cl. 260—683 D **13 Claims**

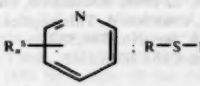
1. A process for converting a feed olefin hydrocarbon having non-tertiary unsaturation selected from the group consisting of:

1. acyclic monoolefins, including those with aryl, cycloalkyl, and cycloalkenyl substituents, having 3–20 carbon atoms per molecule with no branching closer than about the 3- position and no quaternary carbon atoms or aromatic substitution closer than the 4- position to the double bond, and mixtures of such unsubstituted acyclic monoolefins;
2. a mixture of ethylene and one or more acyclic unsubstituted internal monoolefins of (1);
3. acyclic, nonconjugated polyenes having from 5 to about 20 carbon atoms per molecule, containing from 2 to about 4 double bonds per molecule and having at least one double bond with no branching nearer than the 3-position and no quaternary carbon atom nearer than the 4- position to that double bond, or mixtures of such polyenes;
4. a mixture of ethylene and one or more acyclic polyenes of (3) which contain at least one internal double bond;
5. a mixture of one or more monocyclic or bicyclic monoolefins having 7 to 12 ring carbon atoms, including those substituted with up to 3 alkyl groups having up to about 5 carbon atoms, with no branching closer than the 3- position and with no quaternary carbon atoms closer than the 4- position to that double bond with either ethylene or with one or more unsubstituted acyclic monoolefins of (1);
6. monocyclic and bicyclic nonconjugated polyenes having up to 12 ring carbon atoms, including those substituted with up to 3 alkyl groups having up to about 5 carbon atoms each, having at least one double bond with no branching closer than the 3- position and with no quaternary carbon atoms closer than the 4- position to that double bond, and mixtures thereof;
7. a mixture of one or more monocyclic polyenes of (6) with one or more acyclic 1- olefins having from 2 to about 10 carbon atoms, having no branching nearer than the 3-position and no quaternary carbon atoms nearer than the 4- position to the double bond;
8. polar group-substituted olefinic compounds of classes (1) through (7) containing from about 5 to about 20 carbon atoms per molecule in which the polar group, such as a halogen atom, is sufficiently removed from the active double bond (generally, no nearer to the double bond than the 5- position) so as not to interfere with the reaction, and mixtures with unsubstituted members of class (1);

which comprises contacting said feed olefin hydrocarbon with a catalyst system which forms on admixture of

a. a metal complex represented by the formula $[(L)_nM_b(NO)_cZ_d]_e$ wherein M is molybdenum or tungsten; each Z is a halogen, CN, SCN, OCN, $SnCl_3$ or a hydrocarbon carboxylic acid radical having 1 to about 30 carbon atoms; L is a ligand represented by the formula R_3O; R_3QO; $R_2O—QR_2$; CO; NO; O; S;

R_3N; $R_2N\text{-}R^2\text{-}NR_2$



; R—S—R; R^3 S;

$(CHR^4{=}CR^4{-}CH_2)$;
$R(CN)_b$;

(R_2NCSS);
$[(RCO)_2CH$; and $R(COO)_b$;

wherein each R is a saturated aliphatic or aromatic hydrocarbon radical including alkoxy and halo derivatives thereof, having up to 20 carbon atoms; each Q is phosphorous, arsenic, or antimony; R^2 is a divalent saturated aliphatic or aromatic hydrocarbon radical having up to 20 carbon atoms; R^3 is a saturated or ethylenically unsaturated divalent hydrocrbon radical having 3 to 10 carbon atoms; each R^4 is a hydrogen or a methyl radical; each R^5 is an aromatic, saturated aliphatic, or ethylenically unsaturated hydrocarbon radical having up to 20 crbon atoms; *m* is 0–5, *n* is 0–3, *a* is 0–3, *b* is 1–2, *c* is 1–2 and *d* is 0–5; and the number of (L), NO, and Z groups present in the complex is not greater than the number required for the metal to achieve the closed shell electronic configuration of the next higher atomic number inert gas; and *x* is the number of the polymeric state of the compound; and

b. an aluminum containing adjuvant which is:

1. R_eAlX_f,
2. a mixture of compounds of 1),
3. a mixture of one or more of AlX_3 or R_eAlX_f compounds with one or more compounds having the formula $R_g{}^1M^1X_h$, or
4. an AlX_3 compound,

wherein each R is as defined above; each R^1 is hydrogen or R; each X is a halogen; each M^1 is a metal of Group I-A, II-A, II-B or III-A; *e* is 1, 2 or 3, *f* is 0, 1 or 2, the sum of *e* and *f* being 3; *g* is 1, 2 or 3, *h* is 0, 1 or 2, **the sum of** *g* and *h* being equal to the valence of M^1, and wherein the molar proportion of (*b*) to (*a*) is in the range of from about 0.1:1 to about 20:1.

4,010,218

MAINTAINING HF SOLUBILITY IN ALKYLATION ISOBUTANE RECYCLE

Jay E. Sobel, Highland Park, Ill., assignor to UOP Inc., Des Plaines, Ill.

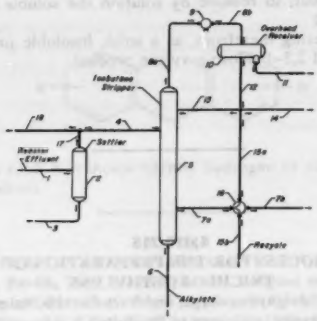
Continuation-in-part of Ser. No. 550,897, Feb. 18, 1975, Pat. No. 3,937,743. This application Nov. 19, 1975, Ser. No. 633,329

The portion of the term of this patent subsequent to Feb. 10, 1993, has been disclaimed.

Int. Cl.² C07C *3/54*

U.S. Cl. 260—683.48 **6 Claims**

1. In a process for producing an alkylation reaction product by reacting an isobutane reactant stream with an olefin-acting reactant stream in contact with an HF acid catalyst wherein said reactant streams are initially combined with an acid saturated recycle stream, hereinafter defined, and then contacted with said HF acid catalyst in a reaction zone at alkylation conditions; a resulting reactor effluent is settled to form an acid phase and a hydrocarbon phase; from **1** to **60%** of said hydrocarbon phase is recycled to the reaction zone and the remainder of said hydrocarbon phase is separated to provide a vaporous overhead stream, a vaporous product stream containing principally n-butane, and a liquid alkylation reaction product stream; said vaporous overhead stream is condensed, cooled to a separation temperature, and separated to provide



an overhead product stream, a reflux stream, an acid liquid stream, and an acid saturated recycle stream including isobutane and entrained acid; and said acid saturated recycle stream is combined with said reactant streams as previously indicated; the improvement which comprises heating said acid saturated recycle stream to a temperature sufficient to place said entrained acid in solution therein prior to combination of said acid saturated recycle stream with said reactant streams.

4,010,219

FLAME RETARDANT POLYESTER COMPOSITION

Toshikazu Aoyama; Hotuma Okasaka, and Hiroshi Kodama, all of Nagoya, Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Continuation of Ser. No. 580,682, May 23, 1975, abandoned, which is a continuation of Ser. No. 424,944, Dec. 17, 1973, abandoned. This application Jan. 16, 1976, Ser. No. 649,714

Claims priority, application Japan, Dec. 28, 1972, 48-2731

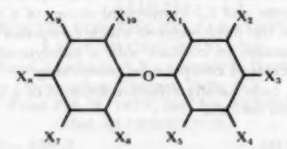
Int. Cl.² C08K *5/59*

U.S. Cl. 260—835 **11 Claims**

1. A flame retardant thermoplastic polyester composition which comprises

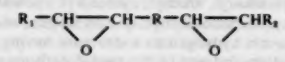
A. a polyester containing at least about 80 mole percent terephthalic acid based upon the total number of moles of dicarboxylic acid, and at least about 80 mole percent 1,4-butanediol based upon the total number of moles of diol,

B. about 4 to 30 weight percent of aromatic halogenated diphenylether represented by the following general formula, said weight percent being based on the weight of the polyester,



wherein each of X_1 through X_{10} represents a member selected from the group consisting of hydrogen, chlorine and bromine, and at least two X's are chlorine or bromine, and

C. about 0.01 to 3 weight percent diepoxy compound based on the weight of the polyester, said diepoxy compound being represented by the general formula



wherein R_1 and R_2 represent hydrogen, alkyl, cycloalkyl, aryl, or aralkyl, and R_1 and R_2 may be bonded to each other, and R represents alkylene, cycloalkylene, arylene alkarylene or aralkylene, each of which may optionally have an ether group and/or an ester group, and R may be optionally bonded to R_1 and/or R_2.

11. The composition of claim 1 wherein the diepoxy compound is selected from the group consisting of polycondensates of epihalohydrin with diol, bis-(2,3-epoxy propanol)-esters which are the product of esterification of dicarboxylic acid with 2,3-epoxypropanol, and cycloaliphatic diepoxides.

4,010,220
CURABLE COMPOSITIONS BASED ON IMIDE GROUP-CONTAINING COMPOUNDS

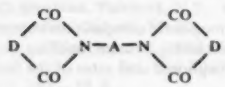
Max Gruffaz, La Mulatiere, and Jean-Louis Locatelli, Vienna, both of France, assignors to Rhone-Poulenc Industries, Paris, France

Filed Feb. 18, 1975, Ser. No. 550,733
Claims priority, application France, Feb. 20, 1974, 74.05717
Int. Cl.² C08G *18/22*; **C08L** *75/00*
U.S. Cl. 260—858 **9 Claims**

1. A curable composition which comprises the following three ingredients:

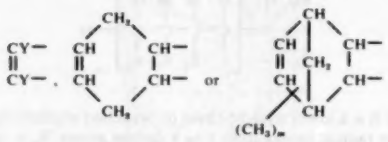
A. an imide-group containing compound which is either:

a. a bis-imide of the formula:



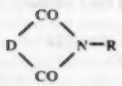
(I)

in which D represents a divalent radical of the formula:



wherein Y represents H, CH_3 or Cl and *m* is 0 or 1, and A represents a divalent organic radical containing 2 to 30 carbon atoms, or

b. a mixture of a bis-imide of formula (I) and a mono-imide of the formula:



(II)

in which D is as defined above and R represents a hydrogen atom or a monovalent organic radical containing 1 to 20 carbon atoms

B. an amino compound which is either:

a. one or more polyamines containing 2 to 5 primary or secondary amino groups, at least one of which is primary, or

b. a mixture comprising one or more polyamines as defined under a) and one or more primary and/or secondary mono-amines and/or one or more secondary polyamines, and

C. a polyurethane elastomer formed by reacting excess of a diisocyanate with a hydroxylic polymer and then reacting the macrodiisocyanate obtained with a coupling agent, the amounts of (A), (B) and (C) being such that: the weight ratio

$$\frac{(C)}{(A)+(B)}$$

is from 1/25 to 5/1, and the ratio

$$\frac{\text{number of double bonds in } (A)}{\text{number of } -NH_2 \text{ groups in } (B)}$$

is from 0.6/1 to 50/1.

4,010,221
POLYVINYL CHLORIDE/COPOLYESTER COMPOSITIONS

Charles J. Gebhart, Akron; Clyde E. Gleim, Bath, and Maria V. Wiener, Akron, all of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Continuation-in-part of Ser. No. 370,113, June 14, 1973, abandoned. This application Nov. 29, 1974, Ser. No. 528,293
Int. Cl.² C08G *39/10*
U.S. Cl. 260—873 **9 Claims**

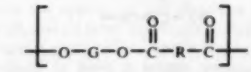
1. Compatible and homogeneous blends comprised of (A) from 90 to 10 percent by weight, based on the total weight of the blend, of an essentially unplasticized polyvinyl chloride having an intrinsic viscosity ranging from 0.60 to 1.0 as measured in cyclohexane at 30° C. and (B) from 10 to 90 percent by weight, based on the total weight of the blend, of an essentially noncrystallizable copolyester having an intrinsic viscosity ranging from 0.50 to 1.10 and a softening point ranging from 70° C. to 220° C., said copolyesters being prepared from the reaction of dicarboxylic acids selected from the group consisting of aliphatic and aromatic dicarboxylic acids or the lower alkyl esters thereof with glycols selected from the group consisting of alkylene glycols containing from 2 to 10 carbon atoms and ethers thereof, cycloalkylene glycols, hydroxyalkylene derivatives of bisphenol A and hydroxy alkylene derivatives of diphenols.

4,010,222
BLENDS OF COPOLYESTERS AND ETHYLENE/CARBOXYLIC ACID COPOLYMERS WHICH ARE AT LEAST TEN PERCENT NEUTRALIZED

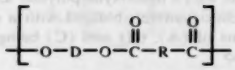
Chi-Kai Shih, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 23, 1975, Ser. No. 580,512
Int. Cl.² C08L *67/06*
U.S. Cl. 260—873 **10 Claims**

1. A blend consisting essentially of 80 to 99.8% by weight of a copolyester consisting essentially of recurring intralinear long chain ester units and short chain ester units randomly joined head-to-tail through ester linkages, the long chain ester units being represented by the formula



and the short chain ester units being represented by the formula



where G is a divalent radical remaining after the removal of terminal hydroxyl groups from at least one long chain glycol having a molecular weight of about 400–6000; R is a divalent radical remaining after removal of carboxyl groups from at least one dicarboxylic acid having a molecular weight less than about 300; and D is a divalent radical remaining after removal of hydroxyl group from at least one low molecular weight diol having a molecular weight of less than 250, said short chain ester units being present in the polyester to the extent of between about 15 and 95% by weight of the polyester, and 0.2 to 20% by weight of a copolymer containing ethylene units and carboxylic acid containing units, said copolymer containing between about 25 and 98.5% by weight ethylene units, and about 1.5 and 30% by weight carboxylic acid containing units, said carboxylic acid units being from 10 to 100% neutralized with metallic ions, said blend having a melt tension of at least 0.4 gm.

4,010,223

ADDUCTS CONTAINING SUCCINIC GROUPS ATTACHED TO ELASTOMERIC COPOLYMERS

Stanley William Caywood, Jr., Wilmington, Del. assignor to E. I. DuPont De Nemours and Co., Wilmington, Del.

Continuation-in-part of Ser. No. 322,360, Jan. 10, 1973, Pat. No. 3,884,882. This application May 16, 1975, Ser. No. 578,136

The portion of the term of this patent subsequent to May 20, 1992, has been disclaimed.

Int. Cl.² C08L *13/00, 55/04*

U.S. Cl. 260—875 **9 Claims**

1. An adduct containing succinic groups attached to an elastomeric copolymer of ethylene, at least one C_3 to C_6 α-olefin, and at least one nonconjugated diene; the adduct having an inherent viscosity of at least one as measured on 0.1 gram of adduct dissolved in 100 milliliters of perchloroethylene at 30° C. and having a gel content less than about 5% as measured by weight percent adduct insoluble in boiling tetrahydrofuran at atmospheric pressure after 48 hours.

4,010,224

PREPARATION OF GRAFT, BLOCK AND CROSSLINKED UNSATURATED POLYMERS AND COPOLYMERS BY OLEFIN METATHESIS

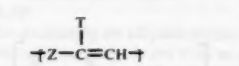
Kenneth W. Scott, Cuyahoga Falls, and Nissim Calderon, Akron, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 435,405, Jan. 21, 1974, abandoned, which is a division of Ser. No. 259,881, June 5, 1972, Pat. No. 3,891,816, which is a division of Ser. No. 882,270, Dec. 4, 1969, Pat. No. 3,692,872. This application Nov. 18, 1974, Ser. No. 524,730

Int. Cl.² C08L *23/00*

U.S. Cl. 260—878 R **2 Claims**

1. A crosslinking reaction wherein at least one polymeric material that is free of non-aromatic conjugation and comprised of structural units of the general formula:



(V)

wherein:

A. T is

1. hydrogen; or
2. a substituent corresponding to the formula $D—CH_2—$, wherein D is any member of the group: alkyl, aryl, aralkyl, alkaryl, alkenyl, cycloalkyl, cycloalkenyl, bicycloalkyl, bicycloalkenyl, and hydrogen; and

B. Z represents hydrogen or a structure having at least one carbon atom and any of the said Z carbons may be:

1. interconnected by single or double bonds;
2. substituted by one or more members of the group: alkyl, aryl, aralkyl, alkaryl, alkenyl, cycloalkyl, bicycloalkyl, cycloalkenyl and bicycloalkenyl;
3. constituents of aromatic, alicyclic or chlorinated alicyclic rings;

in the presence of a multicyclic multiolefin possessing at least two interconnected unsaturated rings that contain 4, 5, 7, 8, 9, 10 and 12 carbon atoms, each of said rings possessing at least one —CH=CH— grouping, and said multicyclic multiolefin being free of non-aromatic conjugation, is exposed to a catalyst capable of inducing ring-opening polymerization and olefin metathesis reaction, said catalyst which will convert 2-pentene into 2-butene and 3-hexene at temperatures lower than about 100° C., leading to a predominantly crosslinked polymeric substance.

4,010,225

BROMINE CONTAINING TELOMERIC PHOSPHONIC ACID ESTERS AS FLAME RETARDANT AGENTS

Siegfried Noetzel, Kelkheim, Taunus; Horst Jastrow, Niederhochstadt, Taunus, and Edgar Fischer, Frankfurt am Main, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

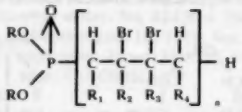
Division of Ser. No. 478,262, June 11, 1974, Pat. No. 3,950,458. This application Sept. 3, 1975, Ser. No. 610,087

Claims priority, application Germany, June 13, 1973, 2329924

Int. Cl.² C08K *5/53;* **C08L** *9/02, 9/06*

U.S. Cl. 260—880 R **3 Claims**

1. A flame-repellent thermoplastic composition comprising a thermoplastic polymer containing a flame repelling amount of a bromine-containing phosphonic acid ester of the formula



where R is a lower straight-chain or branched aliphatic hydrocarbon radical having from 1 to 8 carbon atoms; R_1 to R_4 are hydrogen, halogen or lower alkyl having from 1 to 4 carbon atoms; and n is an integer of from 2 to 30.

4,010,226

BLOCK POLYMERS AND THEIR PREPARATION

Ronald K. Crossland; Jaroslav G. Balas, and Arthur R. Bean, all of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Filed July 17, 1975, Ser. No. 596,774

Int. Cl.² C08L *9/06*

U.S. Cl. 260—880 B **6 Claims**

1. A polymerization process comprising:

a. polymerizing at least one polymerizable compound of the group consisting of conjugated dienes having from 4 to 12 carbon atoms and mono alkenyl-substituted aromatic hydrocarbons having from 8 to 20 carbon atoms under polymerization conditions at a temperature between about −75° C and +150° C with a hydrocarbyl monolithium initiator, the proportions of initiator and polymerizable compound being such as to give a monolithium terminated polymer having an average molecular weight of at least about 7,500;

b. contacting the monolithium terminated polymer with a

polyalkenyl aromatic compound at a temperature between about 10° C and about 90° C, whereby a coupled polylithio intermediate polymer is formed; and

c. block polymerizing therewith at least one polymerizable compound of the group consisting of conjugated dienes, monoalkenyl arenes and monoalkenyl pyrdiene, at a temperature between about −75° C and +150° C each polymer branch so formed having an average molecular weight between about 5,000 to 1,000,000.

4,010,227

O-ALKYL-S-ALKYL-O-(SUBSTITUTED PHENYL)THIOLPHOSPHATES

Jozef Drabek, Allschwil, Switzerland; Manfred Böger, Haltingen, Germany, and Odd Kristiansen, Mohlin, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 455,458, March 27, 1974, Pat. No. 3,917,752. This application Aug. 6, 1975, Ser. No. 601,886

Claims priority, application Switzerland, Apr. 3, 1973, 4737/73; Mar. 5, 1974, 3154/74

Int. Cl.² C07F *9/18*

U.S. Cl. 260—940 **1 Claim**

1. O-Ethyl-S-n-propyl-O-(2-chloro-4-cyano-3,5-dimethylphenyl)-thiolphosphate.

4,010,228

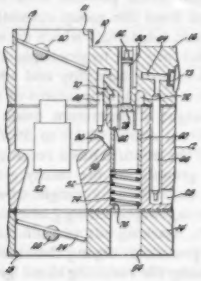
CARBURETOR

Jack L. Seaman, Fairport, N.Y., assignor to General Motors Corporation, Detroit, Mich.

Filed June 20, 1975, Ser. No. 588,886

Int. Cl.² F02M *9/04*

U.S. Cl. 261—23 A **6 Claims**



1. A carburetor comprising a fuel bowl, a main induction passage, a main fuel passage extending from said bowl to said main induction passage, a main throttle in said main induction passage for controlling flow therethrough, an auxiliary induction passage formed as a cylindrical bore, a transfer passage extending from said main induction passage to the side of said auxiliary induction passage and opening thereinto through an inlet port, an auxiliary fuel passage extending from said bowl to said transfer passage, an auxiliary throttle formed as a cylinder conforming to said cylindrical bore, said auxiliary throttle being axially reciprocable in said bore and having an edge traversing said port for controlling flow therethrough, and means operably connecting said auxiliary throttle and said main throttle whereby as said main throttle opens to permit increased flow through said main induction passage said auxiliary throttle is axially displaced in said bore to permit increased flow through said transfer passage, said inlet port and said auxiliary induction passage.

4,010,229

PROCESS FOR THE MANUFACTURE OF SHORT FIBRILS

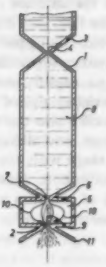
Jean-Pierre Pleska, Paturages, and Michel Marechal, Brussels, both of Belgium, assignors to Solvay & Cie, Brussels, Belgium

Filed Jan. 16, 1975, Ser. No. 541,622

Claims priority, application Luxembourg, Jan. 18, 1974, 69196

Int. Cl.² D01D *5/04*

U.S. Cl. 264—13 **25 Claims**



1. In a process for the manufacture of fibrils of short length by abruptly releasing the pressure acting on a two-phase liquid mixture of molten polymer and solvent and which is at a high pressure and a high temperature, and by ejecting the mixture through a pressure release orifice to vaporize the solvent instantaneously and solidify the polymer, the improvement wherein the flow path of the two-phase liquid mixture is disturbed at the instant when it enters the pressure release orifice.

4,010,230

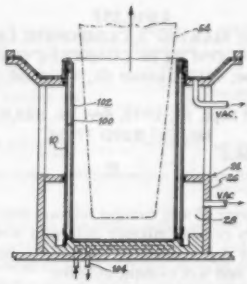
METHOD FOR PRODUCING A DRUM TYPE CONTAINER WITH AIR CUSHION

William Repenning, Haddonfield, N.J., assignor to Natico, Inc., Chicago, Ill.

Continuation-in-part of Ser. No. 342,696, March 19, 1973, Pat. No. 3,893,882. This application Nov. 29, 1974, Ser. No. 528,202

Int. Cl.² B29C *17/04, 25/00;* B29D *3/02*

U.S. Cl. 264—25 **10 Claims**



1. In the method of producing a drum container of large capacity formed of a drum forming shell of structurally strong material open at the upper end and closed at the bottom end by a bottom wall, and an inner container of flexible thin plastic joined at its upper end portion about the upper rim of the shell, dimensioned to have a length corresponding to the length of the shell so that the bottom end will rest upon the bottom wall of the shell, and a diameter less than the diameter of the shell to provide an annular space between the outer side

walls of the plastic container and the inner side walls of the shell to define an air cushion in between, the steps of positioning the cylindrical outer drum shell, while open at the top and closed at the bottom, in a frame member which engages the outer walls of the shell in sealing relation, heating to the stretchable stage a film of thermoplastic material dimensioned to extend across the open top end of the shell and for a distance beyond, effecting a sealing engagement between the portion of the film extending between the open end of the shell and the frame, drawing a vacuum in the space between the interior of the shell and the heated film to stretch the film by vacuum forming into the interior of the shell and towards the walls thereof until the film just engages the walls without bonding thereto and about the upper rim of the shell, terminating the vacuum drawing while the film material is still above its stretchable stage, rapidly cooling the portions of the film stretched about the upper rim of the shell and in engagement with the bottom wall while the remainder of the film is still in the stretchable stage, and allowing the remainder of the film to cool down to set stage with corresponding shrinkage in the circumferential direction to form an annular air space between the outer walls of the film and the side walls of the shell to function as an air cushion.

4,010,231

METHOD OF SEALING LEAKS IN METAL OIL STORAGE CONTAINERS

Kenneth G. Phillips, River Forest, and Alvin J. Frisque, La Grange, both of Ill., assignors to Nalco Chemical Company, Oak Brook, Ill.

Filed May 22, 1974, Ser. No. 472,398
Int. Cl.² E04B *1/16*
U.S. Cl. 264—35 **3 Claims**

1. A method of sealing small leaks in metal oil storage containers which comprises applying to the orifice of the leak a dosage of from about 10–1000 ppm of a water-in-oil emulsion of a water-soluble vinyl addition polymer containing small polymer spheres of an effective size of about 0.5–500 microns.

4,010,232

METHOD OF MAKING A COMPOSITE URETHANE FOAM AND CONCRETE CONSTRUCTION PANEL

Roger Labrecque, 4667 Garnier St., Montreal, Quebec, Canada

Filed Sept. 11, 1974, Ser. No. 505,039
Int. Cl.² B29D *27/04*
U.S. Cl. 264—46.4 **2 Claims**

1. A method of making a construction panel comprising the steps of:

spreading a layer of wet cement mixture into a mold;

powdering dry cement mixture onto said wet cement mixture until a dry blanket of said dry cement mixture is formed on said wet cement mixture;

pouring a foamable urethane reaction mixture onto said dry blanket;

closing a cover of said mold;

allowing said foamable urethane reaction mixture to foam into a urethane foam while the ingress of moisture from said wet cement mixture into said foaming reaction urethane mixture is prevented by said dry cement mixture into which said moisture migrates;

opening said cover after setting of the urethane foam; and

removing a panel of bonded urethane and cement from the mold and allowing the cement to dry outside of said mold.

4,010,233

PRODUCTION OF INORGANIC FIBERS

Gerhard Winter; Manfred Mansmann, both of Krefeld, and Hans Zirngibl, Duisburg, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Continuation of Ser. No. 195,501, Nov. 3, 1971, abandoned. This application Dec. 12, 1973, Ser. No. 424,229
Claims priority, application Germany, Nov. 6, 1970, 2054573
Int. Cl.² D01D *5/04*; **C04B** *35/10*
U.S. Cl. 264—63 **39 Claims**

1. In the production of inorganic fibres by dry spinning a solution, sol or dispersion of the fibre-forming material in a solvent to convert the fibre-forming material to solid homogeneous fibre, collecting the fibre and thereafter heat treating the fibre to enhance its physical properties, the improvement which comprises using as said fibre-forming material a composition which upon heating to a temperature of about 500° to 1600° C in an inert or reducing atmosphere in the form of fibre, forms at least two phases with a miscibility gap, of which one phase is a crystalline metal oxide phase containing the other non-oxide phase in very finely disperse form in about 0.5 to 50% by weight of the fibre, and then heating said fibre to about 500° to 1600° C in said inert or reducing atmosphere to form said two phases in the initially homogeneous fibre.

4,010,234

PRODUCTION OF HIGHLY POROUS ACTIVE ALUMINIUM OXIDE GRANULATE

Ernst Podschus, Leverkusen, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Aug. 12, 1975, Ser. No. 604,014
Claims priority, application Germany, Aug. 17, 1974, 2439543
Int. Cl.² B01J *2/00*
U.S. Cl. 264—117 **2 Claims**

1. A process for producing active aluminum oxide granulate having a pore volume of greater than 50 cc/100 g and up to about 100 cc/100 g which comprises grinding a mixture of ground aluminum oxide powder with at least one ground additive selected from the group consisting of water-soluble salts and non-ionic substances which do not react with aluminum oxide, which are not hygroscopic at room temperature and below 60% relative humidity and which do not undergo phase transformation at temperatures of up to about 100° C., the ratio by weight of aluminum oxide to additive in said mixture being from about 90:10 to 30:70 and said grinding continuing until the mixture has a residue on a 40 μ screen of less than 20%, granulating the thusly ground mixture in the presence of at least 50% by weight of water, based on the aluminum oxide, ageing resulting granulate for at least 5 hours at 50° to 100° C., washing out said selective additive from the resulting aged granulate, drying the resulting washed granulate and activating the resulting dried granulate in a dry gas stream at a temperature of from 200° to 500° C.

4,010,235

MOULDED PLASTIC-RUBBER COMPOSITES

James Frank Yardley, Shenston near Lichfield, and Allen Frederick Nightingale, Birmingham, both of England, assignors to Dunlop Limited, London, England

Division of Ser. No. 303,782, Nov. 6, 1972, abandoned. This application Apr. 17, 1975, Ser. No. 569,318
Claims priority, application United Kingdom, Nov. 18, 1971, 52555/71; Sept. 20, 1972, 43526/72
Int. Cl.² B29H *9/00*
U.S. Cl. 264—241 **7 Claims**

1. A method of producing a bonded molded plastic-rubber composite comprising

injection or transfer molding a thermoplastic, high pressure polymerized ethylene polymer having a melt index or minimum flow rate of not less than 0.25, when measured

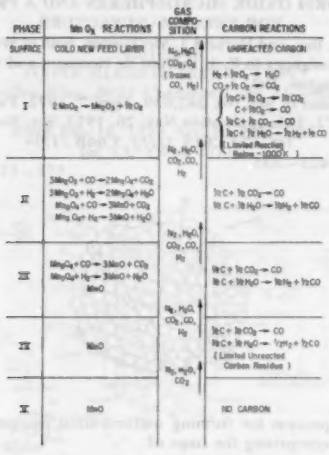
according to the test conditions specified in ASTM Standard D 1238-65T, so that it is brought, in a molten state, into contact with

a prevulcanized rubber component containing from 5 to 55 per cent by volume of a rubbery olefin polymer selected from the group consisting of ethylene/propylene copolymers containing from 20 to 85 mole per cent units derived from ethylene, ethylene/alpha-olefin/diene terpolymers containing from 20 to 85 mole per cent units derived from ethylene and from 0.1 to 10 mole per cent units derived from the diene, and a blend containing one or more of these with up to 80 per cent by weight of at least one other rubber selected from the group consisting of styrenebutadiene rubber, polybutadiene, and polyisoprene, the remainder of the composition comprising ingredients normally used in compounding rubbery olefin polymers.

4,010,236
MANGANESE ORE REDUCTION

Jay Y. Welsh, Catonsville, Md., assignor to Diamond Shamrock Corporation, Cleveland, Ohio

Filed July 21, 1975, Ser. No. 597,824
Int. Cl.² C01G *45/02*
U.S. Cl. 423—49 **10 Claims**



1. A process for the pile reduction of higher oxides of manganese in manganese ore, which comprises passing non-oxidizing gas at 700°–1000° C. into and through an initial bed of solid carbonaceous fuel and manganese ore which has been at least partially reduced to MnO, then directing the resulting hot reducing gas mixture into a contiguous layer of unreduced manganese ore mixed with solid carbonaceous fuel.

4,010,237
EXTRACTION OF NICKEL FROM NICKEL-BEARING ORES

David Alan Harbourne, Kingston, Canada, assignor to Du Pont of Canada Limited, Montreal, Canada

Continuation-in-part of Ser. No. 519,356, Oct. 30, 1974, abandoned. This application May 10, 1976, Ser. No. 684,933
Claims priority, application Canada, Nov. 7, 1973, 185246
Int. Cl.² C01G *53/00*
U.S. Cl. 423—150 **8 Claims**

1. In a process for the extraction of nickel values from a nickel oxide/silicate ore having a magnesia content measured as MgO greater than the iron content measured as Fe_2O_3, the improvement which comprises contacting the ore in the presence of oxygen with an aqueous solution of a polyalkylenehexamine having a pH in the range from about 7 to about 12, said amine having the formula $NH_2(CH_2)_nNH(CH_2)_mNH(CH_2)_nNH(CH_2)_mNH(CH_2)_nNH_2$ wherein *n* and *m* are 2 or 3, *n* and *m* being the same or different.

4,010,238
PROCES FOR SELECTIVE REMOVAL OF NITROGEN OXIDES FROM WASTE GASES

Tatsuo Shiraishi; Shinkichi Shimizu; Hiroshi Ichihashi, and Tadashi Shindo, all of Niihama, Japan, assignors to Sumitomo Chemical Company, Limited, Japan

Filed Mar. 19, 1974, Ser. No. 452,659
Claims priority, application Japan, Mar. 26, 1973, 48-34895
Int. Cl.³ B01J *8/00*; C01B *21/00*
U.S. Cl. 423—239 **13 Claims**

1. A process for the selective removal of nitrogen oxides from waste gases containing nitrogen oxides, which comprises contacting the waste gases with ammonia in the presence of a metal oxide catalyst for the reduction of nitrogen oxides with ammonia, said catalyst consisting essentially of a composition having the following formula

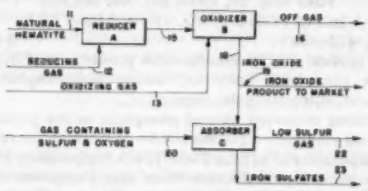
$$V_xA_yO_z$$

wherein V is vanadium; A is at least one element selected from the group consisting of copper, zinc, tin, lead, titanium, phosphorus, chromium, iron, cobalt and nickel; *x* and *y* are each a numeral of 0.5 to 12; and *z* is determined by the valence requirements of the other elements in said compound.

4,010,239
IRON OXIDE SORBENTS FOR SULFUR OXIDES

Abraham A. Dor, Lakewood, Ohio, assignor to The Hanna Mining Company, Cleveland, Ohio

Filed Oct. 5, 1973, Ser. No. 403,952
Int. Cl.² C01B *17/60*; C01G *49/06*
U.S. Cl. 423—244 **5 Claims**



1. In a process for removing sulfur oxides from a gas containing sulfur oxides and oxygen by contacting said gas with an iron oxide sorbent in an absorption zone at a temperature of from about 250° to about 700° C. to form iron sulfate-bearing solids and a gas reduced in sulfur oxide content, the improvement comprising the use of an iron oxide prepared by the process comprising the steps of

a. providing a quantity of hematite,

b. heating the hematite in the presence of reducing agents at a temperature below about 1000° C. to produce magnetite-bearing solids, and

c. oxidizing said magnetite-bearing solids at a temperature below about 600° C. to produce an iron oxide-bearing sorbent.

4,010,240
PROCESS FOR THE REGENERATION OF SULFURIC ACID

Helmold von Plessen, Kelkheim, Taunus; Eberhard Fischer, Hofheim, Taunus, and Siegfried Schiessler, Frankfurt am Main, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed June 12, 1974, Ser. No. 478,631

Claims priority, application Germany, June 14, 1973, 2330281

Int. Cl.² C01B *17/90;* **C23F** *11/04*

U.S. Cl. 423—269 **10 Claims**

1. A two-step process for the continuous regeneration of contaminated aqueous 65 to 95% sulfuric acid to obtain essentially pure 95 to 98% sulfuric acid, which comprises adding to said contaminated sulfuric acid a hexavalent chromium compound as a corrosion inhibitor and in a first step continuously feeding said contaminated 65 to 95% sulfuric acid containing metal salt contaminants and a small amount of up to 4% by weight organic impurities, calculated as carbon, to a cast iron dephlegmator mounted on an external heated vessel containing concentrated boiling sulfuric acid at atmospheric pressure, removing overhead water vapor and volatile organic contaminants, continuously withdrawing as a bottoms product 95 to 98% concentrated contaminated acid and continuously feeding the withdrawn acid, in a second step, to a cast iron distillation unit in which boiling concentrated sulfuric acid is maintained, continuously removing and recovering overhead essentially pure 95 to 98% concentrated sulfuric acid and withdrawing and removing from the distillation step nonvolatile metal salt contaminants as a bottoms product.

4,010,241
PROCESS FOR THE PRODUCTION OF HYDROGEN FLUORIDE, PHOSPHORIC ANHYDRIDE, CALCIUM POLYPHOSPHATES AND NITRIC ACID

Alfred Lvovich Mosse, Leninsky prospekt, 72a, kv. 66; Vladimir Vasilievich Pechkovsky, ulitsa Derevoobdelochnaya, 27, kv. 55; Anatoly Ivanovich Teterevkov, ulitsa Kalinovskogo, 5, kv. 4; Igor Sergeevich Burov, ulitsa Yakuba Kolosa, 39, kv. 48, all of Minsk; Jury Nikolaevich Vilk, prospekt Energetikov, 60, kv. 65; Vadim Andreevich Ershov, prospekt Veteranov, 105, kv. 29, both of Leningrad; Alexandr Antonovich Chelnokov, ulitsa Knorina, 11/2 kv. 114, Minsk; Oleg Iosifovich Yasko, ulitsa Kalinovskogo, 73, korpus 2, kv. 5, Minsk; Vladimir Vladimirovich Bysjuk, ulitsa Ostrovskogo, 27, kv. 56, Minsk, and Elena Dmitrievna Dzjuba, ulitsa Very Khorunzhei, 18, kv. 19, Minsk, all of U.S.S.R.

Filed Aug. 27, 1974, Ser. No. 501,081

Int. Cl.² C01B *25/12, 15/16, 21/38, 7/22*

U.S. Cl. 423—304 **3 Claims**

1. A process for the simultaneous production of hydrogen fluoride, phosphoric anhyride, calcium polyphosphates and nitric acid, comprising the steps of:

a. heating dispersed natural phosphate in the presence of water vapors by a plasma stream of working gas of a bulk temperature of at least 2500° K to a temperature ensuring the recovery of fluorine from said phosphate to form hydrogen fluoride, the bulk temperature of said stream decreasing;

b. separating said cooled stream containing the hydrogen fluoride from the heated defluorinated phosphate and recovering the hydrogen fluoride from the stream;

c. heating the defluorinated dispersed phosphate by a stream of air plasma having a bulk temperature of at least 3500° K and containing nitrogen oxides, said phosphates decomposing to form phosphoric anhydride and calcium oxide, and the nitrogen oxides being quenched;

d. dividing the stream of air plasma, containing nitrogen oxides, phosphoric anhydride and calcium oxide into two separate streams;

e. cooling one of said streams to a bulk temperature that is not lower than the point at which reaction starts between calcium oxide and phosphoric anhydride; recovering calcium oxide; further cooling the stream to the condensation point of phosphoric anhydride and recovering the latter, and absorbing the nitrogen oxides from the stream by a weak nitric acid or water so that nitric acid is formed;

f. cooling the other stream to a bulk temperature that is below the point at which reaction between phosphoric anhydride and calcium oxide starts, but not below the condensation temperature of phosphoric anhydride; recovering the resulting calcium polyphosphates in the form of solid particles, and absorbing nitrogen oxides from the stream by weak nitric acid or water so that nitric acid is formed.

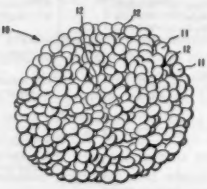
4,010,242
UNIFORM OXIDE MICROSPHERES AND A PROCESS FOR THEIR MANUFACTURE

Ralph K. Iler, and Herbert J. McQueston, both of Wilmington, Del., assignors to E. I. DuPont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 242,039, April 7, 1972, Pat. No. 3,855,172. This application Nov. 20, 1973, Ser. No. 417,595

Int. Cl.² C01B *33/12;* **C04B** *21/04*

U.S. Cl. 423—335 **6 Claims**



1. A process for forming uniform-sized inorganic microspheres comprising the steps of:

a. forming an aqueous sol containing uniform-sized inorganic- refractory colloidal particles which have hydroxylated surfaces and which are dispersible in said aqueous sol, said colloidal particles being isodimensional or rod-shaped particles with at least two dimensions in the range of 5 to 500 millimicrons and a third dimension in the range of 5 to 1,000 millimicrons;

b. forming a homogeneous solution of said aqueous sol with a polymerizable material comprising formaldehyde and a second organic material selected from the group consisting of urea and melamine;

c. reducing the pH of said solution to a level at which polymerization of said polymerizable materials occurs to cause coacervation of said organic material and said colloidal particles into substantially spherical microspheres having a diameter of about 0.5 to about 20.0 microns and to initiate copolymerization of said organic materials, said colloidal particles being insoluble in the acid medium at the selected pH;

d. solidifying the microspheres so formed;

e. collecting, washing and drying said microspheres; and

f. oxidizing said microspheres at elevated temperatures to burn off the organic material without melting said colloidal particles, whereby forming uniform-sized porous inorganic microspheres.

4,010,243

PREPARATION FOR POTASSIUM BICARBONATE FROM POTASSIUM HALIDE

Ian M. Thomas, Temperance, Mich., assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Nov. 28, 1975, Ser. No. 638,225

Int. Cl.² C01D 7/16

U.S. Cl. 423—424 17 Claims

9. A method of manufacturing potassium bicarbonate comprising reactively combining a potassium halide, an alkylamine and carbon dioxide in the presence of a miscible aqueous alcoholic medium, and wherein said alkylamine is employed in at least stoichiometric amounts relative to said halide, so as to form said bicarbonate, said medium being so selected that said bicarbonate is more insoluble therein than in water alone, and separating said bicarbonate and wherein said amine contains from 1 to 12 carbon atoms.

4,010,244

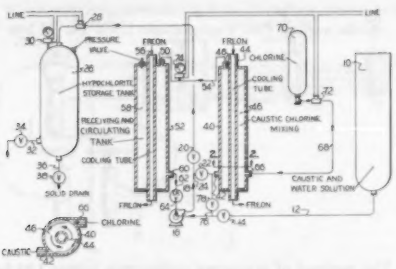
HYPOCHLORITE PRODUCTION

Arthur Shelley King, 8021 Cherokee Lane, Leawood, Kans. 66206

Filed July 16, 1975, Ser. No. 596,319

Int. Cl.² C01B 11/06

U.S. Cl. 423—473 4 Claims



1. In a method of producing hypochlorite solution, the steps of:

introducing a stream of liquid chlorine into the lower end of an upright, cylindrical, reactor-mixer vessel for immediate change into the gaseous state within the vessel;

introducing a stream of aqueous sodium hydroxide into the lower end of the vessel simultaneously with said introduction of the chlorine for reaction and mixing with the latter to produce a hypochlorite solution;

removing the finished hypochlorite solution from the vessel adjacent the upper end of the latter;

cooling the solution as the chlorine and sodium hydroxide streams react by exposing the same to a centrally disposed, upright cooling tube within the vessel; and

causing said streams to swirl upwardly through the vessel and around said tube in laminar flow relationship as said reaction, mixing and cooling take place by effecting said introduction of the streams at substantially diametrically opposed locations on the vessel and in tangential relationship with the latter,

said production of the solution being carried out with an absence of air space in the vessel to prevent escape of the chlorine gas from the solution.

4,010,245

PRODUCTION OF HYDROGEN FLUORIDE AND CALCIUM SULFATE

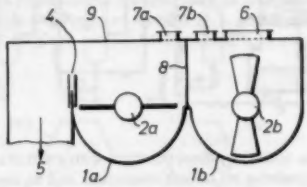
Bernhard Spreckelmeyer, Leverkusen; Hans Guth, Bergisch-Neukirchen; Werner Schabacher, and Hermann Rohe, both of Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed July 15, 1975, Ser. No. 596,050

Claims priority, application Germany, July 24, 1974, 2435512

Int. Cl.² C01B 7/22; C01F 11/46

U.S. Cl. 423—485 8 Claims



1. In the production of hydrofluoric acid and calcium sulfate by subjecting sulfuric acid and fluorspar to a partial preliminary reaction in a preliminary reaction zone and the reaction is completed in an after-reaction zone at a temperature from about 100° to 500° C, the improvement which comprises effecting the preliminary reaction by circulating preliminary reaction product comprising partially reacted fluorspar mixed with calcium sulfate through said preliminary reaction zone comprising first and second adjacent beds connected together at their ends, continuously adding to the circulating preliminary reaction product at spaced locations in the preliminary reaction zone sulfuric acid preheated to a temperature of about 80° to 200° C and fluorspar preheated to a temperature of about 400° to 800° C, removing from said preliminary reaction zone gaseous hydrofluoric acid, continuously removing from the first bed a portion of the material comprising a substantially dry mixture of calcium sulfate, unreacted sulfuric acid and fluorspar, passing said dry mixture of calcium sulfate, unreacted sulfuric acid and fluorspar to said after-reaction zone, the balance of the material from the first bed being returned to the second bed, therein being first mixed with sulfuric acid and at a downstream location spaced therefrom being mixed with fluorspar, the resultant mixture being passed to the first bed, and therein being mixed with additional sulfuric acid prior to removal of another portion of the material, at least about 50% but less than 100% of the quantity of sulfuric acid required for the complete reaction being introduced into the preliminary reaction zone and the remaining sulfuric acid being introduced into the after reaction zone.

4,010,246

PROCESS FOR PREPARING SULFUR DIOXIDE

Heinz Steinrötter, Eppstein, Taunus; Karl Walderbach, Frankfurt am Main, and Hansjorg Mathieu, Schneidhain, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Oct. 10, 1975, Ser. No. 621,583

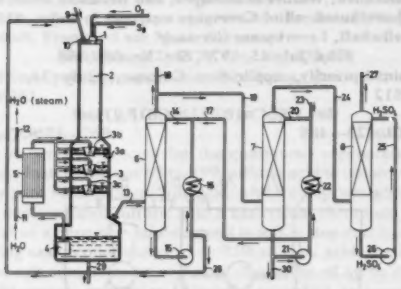
Claims priority, application Germany, Oct. 12, 1974, 2448676

Int. Cl.² C01B 17/58; B01D 47/00

U.S. Cl. 423—542 7 Claims

1. A process for the preparation of essentially pure sulfur dioxide from waste sulfuric acid containing metal salt impurities and at least 50% by volume sulfuric acid, which consists essentially of burning finely divided liquid sulfur with an oxygen containing gas, containing at least 70% by volume oxygen, to produce not flame gases and directly heating the waste sulfuric acid with the hot flame gases to a temperature of

1,000° to 1,500° C to obtain a combustion gas consisting essentially of SO_2, water, O_2, metal salt impurities and a small amount of SO_3, cooling the hot gases to a temperature of



about 300° to 500° C by direct contact with a salt melt quench coolant to condense metal salt impurities and to separate the metal salt impurities from the combustion gas.

4,010,247

METHOD FOR MAKING WATER DISPERSIBLE ALUMINUM HYDROXIDE

Martin Wilhelm Wassermann, Hamburg, and Arnold Wilhelm Meyer, St. Michaelisdonn, both of Germany, assignors to CONDEA Petrochemie-Gesellschaft m.b.H., Brunsbuettel, Germany

Filed Feb. 10, 1975, Ser. No. 548,804

Claims priority, application Germany, Feb. 21, 1974, 2408233

Int. Cl.² C01F *7/02*

U.S. Cl. 423—626 **15 Claims**

1. A process for making water dispersible aluminium hydroxide comprising contacting an acid dispersible Boehmite aluminium hydroxide powder having a content of 65 to 85 weight % of Al_2O_3 a bulk density of 500 to 700 g/l, a specific surface area by the B.E.T. procedure of 140 to 350 m^2/g and an average particle size below 100 μm and which has been formed by the hydrolysis of an aluminium alcoholate with a gaseous acid at an addition concentration of about 1 to 9 weight %, said gaseous acid being hydrogen chloride NO_2, a mixture of NO_2/N_2O_4 or acetic acid vapor.

4,010,248

PROCESS FOR PRODUCING TRIALKALI METAL ALUMINUM HEXAHYDRIDE

Gunner E. Nelson, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Continuation-in-part of Ser. No. 512,120, Oct. 4, 1974. This application Nov. 20, 1974, Ser. No. 525,394

Int. Cl.² C01B *6/04*

U.S. Cl. 423—644 **18 Claims**

1. A process for producing trialkali metal aluminum hexahydride which comprises:

reacting

1. alkali metal
2. aluminum and
3. hydrogen

in the presence of a catalytic amount of at least about 0.001 percent by weight of alkali metal aluminum dihydrocarbon dihydride, based on the alkali metal fed to the process, and of an inert aromatic hydrocarbon solvent for alkali metal aluminum dihydrocarbon dihydride, under conditions suitable to form trialkali metal aluminum hexahydride, thereby producing trialkali metal aluminum hexahydride.

4,010,249

PROCESS FOR THE PREPARATION OF HYDROGEN

Anthony A. duPont, 8 Georgeff Road, Rolling Hills, Calif. 90274

Filed Sept. 15, 1975, Ser. No. 613,236

Int. Cl.² C01B *1/08*; **C01G** *53/02*, *53/04*, *53/00*

U.S. Cl. 423—657 **5 Claims**

1. A process for generating hydrogen which comprises: (a) reacting nickel metal with water to form nickel hydroxide and hydrogen; (b) decomposing the hydroxide to the oxide and water with the addition of heat; (c) reacting iodine with the nickel oxide to form nickel iodide and nickel iodate; (d) decomposing the nickel iodate by the introduction of heat to form nickel oxide; (e) decomposing the nickel iodide by the introduction of heat to recover the original nickel; and (f) recycling the recovered nickel into step (a) of the process.

4,010,250

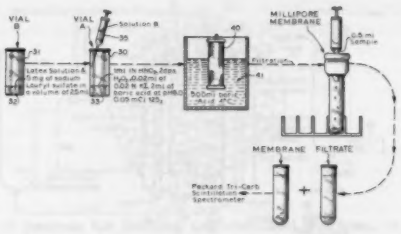
RADIOACTIVE IODINE (125I) LABELING OF LATEX PARTICLES

Gokaldas C. Parikh, and Chi Kuan Ho, both of Brookings, S. Dak., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 6, 1975, Ser. No. 556,061

Int. Cl.² A61K *43/00*

U.S. Cl. 424—1 **2 Claims**



1. The method of preparing radioactive iodine **125** labeled latex particles of polyvinyl toluene in a predetermined size range of 2.02 μm to 0.37 μm in diameter comprising the following steps:

Step 1, prepare a first solution which contains 1 ml of 1 N nitric acid, 2 drops of concentrated hydrogen peroxide, 0.02 ml of 0.02 N potassium iodide, 2 ml of boric acid buffer at pH 8.0, and 0.05 mCi of carrier-free ^{125}I;

Step 2, prepare a second solution which contains 0.1 ml of 1:200 dilution polyvinyltoluene latex, 5 mg of sodium lauryl sulfate and 2.4 ml of dionized water;

Step 3, add a drop of 0.1 N sodium nitrite to said first chemical solution;

Step 4, transfer said first chemical solution to said second chemical solution in a drop by drop process, said solution being stirred constantly for a predetermined period of time;

Step 5, add 1.02 ml of 1 N sodium hydroxide;

Step 6, add the material thus compounded to a dialysis bag by a very slow drop by drop process, said material being maintained in said dialysis bag up to 36 hours while suspended in a dialysis solution of boric acid, said dialysis solution being periodically changed and analyzed;

Step 7, said material being removed from said dialysis bag for use subsequently in the process of tagging certain virus.

4,010,251

SCANNING AGENT COMPOSITION AND USE IN IMAGING LIVER AND FOR BILIARY FUNCTION

Allan M. Green, Cardinal Lane, Gates Mill, Ohio 44040

Filed Dec. 16, 1974, Ser. No. 533,109
Int. Cl.² A61K *29/00, 43/00*
U.S. Cl. 424—1.5 **15 Claims**

1. A scanning agent composition comprising glycoproteins and glycopeptides having glycosidic side chains terminating in a sialic acid moiety followed by a galactose, said glycoproteins and glycopeptides having been desialylated and chemically combined with a compatible radioisotope suitable for hepatobiliary imaging.

4,010,252

ANTIMICROBIAL COMPOSITIONS

Gordon Trent Hewitt, Upper Montclair, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

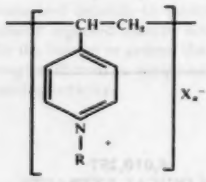
Filed Dec. 19, 1974, Ser. No. 534,270
Int. Cl.² A61K *7/34, 7/36, 7/38*
U.S. Cl. 424—47 **14 Claims**

1. An antimicrobial composition comprising the product resulting from admixing (1) a compound selected from the group consisting of a poly (quaternary ammonium) compound having the formula

I

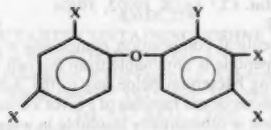
wherein n is about 2–200, A is the anion of an acid, and R^1 and R^4 are polymethylene containing 6 to 20 carbon atoms and R^2, R^3, R^5 and R^6 are alkyl containing 1 to 3 carbon atoms

II



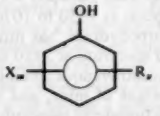
wherein $n = 10^2$ to 5×10^3; R is alkyl containing 6 to 15 carbon atoms, x is halide metho-sulfate or etho-sulfate and (2) at least one compound selected from the group consisting of compounds having the formula

III



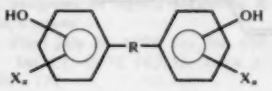
wherein Y is hydrogen or hydroxy and X halogen, $-CF_3$ or $-H$,

IV



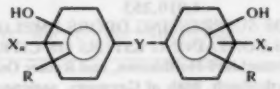
wherein R is a substituent selected from the group consisting of methyl and phenyl, each X is at least one of bromine and chlorine, y is 0 or 1, and m is an integer of about 1 to 5 (5-y), inclusive;

V



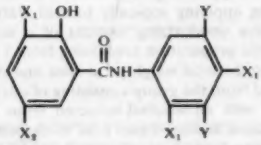
wherein X represents a halogen such as chlorine or bromine, n represents an integer of about 1 to 3, and R represents S or a divalent alkylene radical having about 1 to 4 carbon atoms;

VI

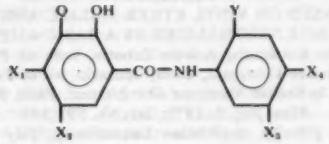


wherein X represents a halogen such as chlorine or bromine, n is an integer of about 1 to 3, R is an alkyl group containing about 1 to 4 carbon atoms and Y is S or a divalent radical having about 1 to 4 carbon atoms;

VII

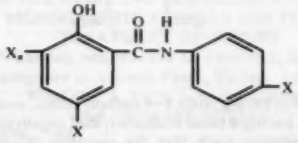


wherein each X_1 represents hydrogen or halogen, X_2 represents a halogen, and Y represents hydrogen, halogen or trifluoromethyl;

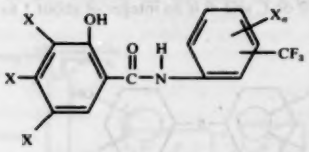


wherein Q represents a member selected from the group consisting of hydrogen, chlorine, bromine, and iodine, X_1 and X_2 each represent a member selected from the group consisting of hydrogen, chlorine, bromine, iodine and CH_3, X_3 represents a member selected from the group consisting of hydrogen, chlorine, bromine and CH_3 and X_4 and Y each represent a member selected from the group consisting of hydrogen, chlorine and bromine, there being at least two halogen substituents in the X positions;

IX



wherein X is chlorine, bromine or iodine and n is 0 to about 1;



wherein X is chlorine, bromine, iodine or hydrogen and *a* is 0 to about 2, with the proviso that there is at least one and not more than three directly attached halogen atoms, none of which is adjacent to any of the others or to the CF_3 group.

4,010,253

PROCESS OF SUPPRESSING ODORS EMPLOYING DEODORANTS CONTAINING ESTERS OF CITRIC ACID

Günter Reese, Dusseldorf-Holthausen, and Rainer Osberghaus, Dusseldorf-Urdenbach, both of Germany, assignors to Henkel & Cie G.m.b.H., Dusseldorf-Holthausen, Germany

Filed Apr. 2, 1975, Ser. No. 564,555

Claims priority, application Germany, Apr. 16, 1974, 2418338

Int. Cl.² A61K *7/32*

U.S. Cl. 424—47 **6 Claims**

1. A process for suppressing body odor in a warm-blooded animal comprising applying topically to said warm-blooded animal an effective deodorizing amount of a substantially anhydrous cosmetic preparation containing from 1 to 25% by weight based upon the total weight of at least one citrate ester of an acid selected from the group consisting of citric acid and acetylcitric acid with an alcohol selected from the group consisting of alkanol having from 1 to 6 carbon atoms, a cycloalkanol having from 5 to 6 carbon atoms and an alkanepolyol having 2 to 6 carbon atoms and 2 to 6 hydroxy groups; and the remainder of inert cosmetic ingredients.

4,010,254

GELS BASED ON VINYL ETHER-MALEIC ANHYDRIDE COPOLYMER NEUTRALIZED BY A BASIC AMINO ACID

Constantin Koulbanis; Arlette Zabotto, both of Paris, and Jean-Claude Contamin, Chilly Mazarin, all of France, assignors to Societe Anonyme dite: L'Oreal, Paris, France

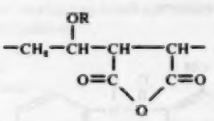
Filed July 7, 1975, Ser. No. 593,243

Claims priority, application Luxembourg, July 8, 1974, 70487

Int. Cl.² A61K *7/48*

U.S. Cl. 424—78 **10 Claims**

1. A gel comprising an aqueous solution of a vinyl ether-maleic anhydride copolymer, a 0.5–5 weight percent aqueous solution of said copolymer having a viscosity ranging between 1 and 1000 poises measured at 25° C and at a pH of 7, said copolymer having a repeating unit of the formula



wherein R is alkyl having from 1–4 carbon atoms, and at least one amino acid having a basic character, said copolymer being present in an amount such that the viscosity of said gel is between 10 and 100 poises and said amino acid being present in an amount effective to impart to said solution a pH ranging between 3 and 9.

4,010,255

SEX PHEROMONE FOR POTATO TUBEWORM MOTH, *PHTHORIMEA OPERCULELLA*

Ring T. Carde; Jan P. Kochansky, and Wendell L. Roelofs, all of Geneva, N.Y., assignors to Cornell Research Foundation, Inc., Ithaca, N.Y.

Filed June 19, 1975, Ser. No. 588,343

Int. Cl.² A01N *17/14*

U.S. Cl. 424—84 **3 Claims**

1. In a method for control of the male potato tuberworm moth, *Phthorimea operculella*, by subjecting said moth to a sex attractant in an amount sufficient to attract the moth to a particular location, the improvement which comprises the use as said sex attractant of an effective amount of trans-4, cis-7-tridecadienyl acetate.

4,010,256

MALE CONTRACEPTIVE AND METHOD OF ACHIEVING MALE CONTRACEPTION

Albert F. Parlow, Torrance, Calif., assignor to Professional Staff Association of the Los Angeles County Harbor General Hospital, Torrance, Calif.

Filed July 30, 1975, Ser. No. 600,301

Int. Cl.² A61K *37/38*, *39/00*

U.S. Cl. 424—88 **5 Claims**

1. A method of immunization of human males to achieve contraception which includes the step of administering, periodically, predetermined amounts of, non-primate, highly purified FSH having a biologic potency of at least 1,000 I.U./mg., an LH contamination of below 11 I.U./mg. and a TSH contamination of less than 0.1 I.U./mg. to a human male until his sperm production declines below about twenty million per cc.

4,010,257

BIOLOGICAL EXTRACTS

Christopher Adlam, Farnborough, and David Eric Reid, West Wickham, both of England, assignors to Burroughs Wellcome Co., Research Triangle Park, N.C.

Filed Feb. 22, 1974, Ser. No. 445,309

Claims priority, application United Kingdom, Feb. 23, 1973, 9149/73

Int. Cl.² A61K *39/02*, *39/04*

U.S. Cl. 424—92 **17 Claims**

1. A pharmaceutical composition comprising a glycopeptide which glycopeptide is obtainable from the cell wall of an immunostimulating bacterium belonging to the Actinomycetaceae or Mycobacteriaceae families of Prevot's classification, which glycopeptide is substantially insoluble in water, physiological saline, methanol, ethanol, phenol, chloroform, dioxan, pyridine, dimethylformamide, diethylene glycol, and hexane; has an absorption in the infra-red spectrum at 1550 and 1660 cm^{-1} consistent with the presence of peptide; has an absorption in the infra-red spectrum between 950 and 1100 cm^{-1} with a maximum absorption at 1050 to 1070 cm^{-1} consistent with the presence of carbohydrate; has little or no lipid absorption in the infra-red spectrum at 2850 to 2950 cm^{-1}, and which glycopeptide after intravenous administration increases the liver and spleen weight of mice, and increases the life expectance of mice with tumour in association with a pharmaceutically acceptable carrier therefor.

4,010,258

MICROBIAL AMYLASE INHIBITOR AND PREPARATION THEREOF WITH THE USE OF STREPTOMYCES DIASTICUS VAR. AMYLOSTATICUS

Sawao Murao, Sakai, Japan, assignor to Ajinomoto Co., Inc. and Eisai Co., Ltd., both of Tokyo, Japan

Filed Mar. 12, 1975, Ser. No. 557,555

Claims priority, application Japan, Mar. 15, 1974, 49-29646; Mar. 15, 1974, 49-29647

Int. Cl.² A61K *35/00*; G07F *3/02*

U.S. Cl. 424—115 15 Claims

1. A process for producing an amylase inhibitor, Amylostatin-A, of claim 2 which comprises aerobically cultivating *Streptomyces diastaticus var. amylostaticus* FERM P-2499 in a medium containing an assimilable carbon source, nitrogenous material and inorganic salts, accumulating an effective amount of Amylostatin-A in the broth, and recovering the accumulated Amylostatin-A.

2. An amylase inhibitor, Amylostatin-A, prepared by the process of claim 1 having an oligo- or poly-saccharide constitution and characterized by the following physicochemical and biological properties:

a. having a specific activity on certain amylases; the capability of inactivating α-amylase and glucoamylase, but the incapability of inhibiting β-amylase and isoamylase,

b. being stable at room temperature as well as being heat resistant at a range of pH from 1 to 12,

c. having an infrared absorption spectrum when pelleted with potassium bromide exhibiting the absorption band shown in appended FIG. 1,

d. having an apparent molecular weight of about 2000 calculated on the basis of gel filtration and employing reference proteins,

e. being soluble in water and pyridine but substantially insoluble in methanol, ethanol, chloroform and acetone,

f. having adsorbability on active carbon in a pH range of 1 to 12 but in aqueous solution of pH 1 to 14 not being adsorbed on strongly acidic and strongly basis ion-exchange resins.

14. A method of treating living creatures of the group consisting of humans and animals to inhibit the digestion and absorption of starch ingested thereby which comprises orally administering to the human or animal the amylase inhibitor of claim 1 in a dosage sufficient to mitigate the disorder or symptom without causing toxicity.

4,010,259

DISINFECTANTS CONTAINING IODINE COMPLEXED TO A HYDROPHILIC ORGANIC CARRIER

J. A. Olof Johansson, Ejdervagen 14, Veberod, Sweden

Filed July 17, 1975, Ser. No. 596,725

Int. Cl.² A61L *13/00*

U.S. Cl. 424—150 7 Claims

1. A disinfectant containing up to 20% iodine in complexed form, wherein iodine is complexed to a hydrophilic organic carrier, which

is a cross-linked polymerisation product of a poly-hydroxylic organic material and a bi-functional cross-linking agent, which forms a three dimensional lattice, kept together by covalent bonds, and which is insoluble in water, but capable of swelling in water to form a gel, the swelling capacity of the carrier being such that 1 g of the dry carrier forms a gel having a volume of from 2 to 100 ml when completely swelled in water.

4,010,260

DERIVATIVES OF RETRO-ENANTIO-SOMATOSTATIN, INTERMEDIATES THEREFOR, AND PROCESS THEREFOR

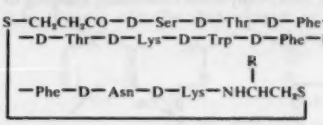
Hans U. Immer, Mount Royal; Nedumparambil A. Abraham, Dollard des Ormeaux, and Verner R. Nelson, Kirkland, all of Canada, assignors to Ayerst McKenna & Harrison Ltd., Montreal, Canada

Filed July 28, 1975, Ser. No. 599,448

Int. Cl.² C07C *103/52*; A61K *37/00*

U.S. Cl. 424—177 52 Claims

17. A compound of the formula I



in which R is hydrogen or $CONHCH_2CONHCH_2CH_3$.

51. A method of treating diabetes which comprises administering a therapeutically effective amount of a compound of formula I as claimed in claim 17 together with a pharmaceutically acceptable carrier therefor.

4,010,261

METHOD TO PREVENT REPRODUCTION WITH [DES-GLY]¹⁰-GN-RH NONADEPTIDE AMIDE ANALOGS IN POSITION

Edwin Samuel Johnson, Antioch, and Riemond Henry Rippel, Jr., Gurnee, both of Ill., assignors to Abbott Laboratories, North Chicago, Ill.

Filed Nov. 25, 1974, Ser. No. 526,482

Int. Cl.² A61K *37/00*; C07C *103/52*

U.S. Cl. 424—177 6 Claims

1. The process for preventing reproduction consisting essentially in administering to a female, warm-blooded animal in or before reaching the reproductive age, between 2 – 200 μg./kg./day of the nonapeptide L-pGlu-L-His-L-Trp-L-Ser-L-Tyr-X-L-Leu-L-Arg-L-Pro-NH-R wherein X denotes the optically active D-form of an aminoacid of the formula —NH—-CHR′—CO— with R′ being a linear or branched carbon chain of 1 – 4 carbon atoms and wherein R is loweralkyl for at least one day in the period before said female produces one or more mature ova or after ovulation has occurred.

4,010,262

METHOD FOR REDUCING THE INCIDENCE OF SCOURS IN MONOGASTRIC ANIMALS AND FOR THE TREATMENT OF SCOURS

Bartley P. Cardon, and Howard M. Frederick, both of Tucson, Ariz., assignors to Arizona Feeds, Tucson, Ariz.

Filed Oct. 6, 1975, Ser. No. 619,903

Int. Cl.² A61K *31/715*

U.S. Cl. 424—180 9 Claims

1. The method of reducing the incidence of scours in monogastric animals, comprising feeding to the animal an effective amount of pregelatinized starch.

4,010,263

INSECTICIDAL ACTIVE THIOPHENE PHOSPHOROUS DERIVATIVES

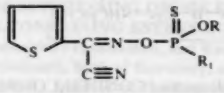
Arnold D. Gutman, Berkeley, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Continuation-in-part of Ser. No. 406,042, Oct. 12, 1973, abandoned, which is a continuation-in-part of Ser. No. 325,491, Jan. 22, 1973, abandoned, which is a division of Ser. No. 179,233, Sept. 9, 1971, abandoned. This application May 5, 1975, Ser. No. 574,781

Int. Cl.² A01N 9/36

U.S. Cl. 424—202 4 Claims

1. A method of killing insects selected from the insect orders of Diptera, Orthoptera, Hemiptera, Homoptera, Coleoptera and Lepidoptera selected from the group consisting of Cabbage Looper and Beet Armyworm comprising applying to the habitat thereof an insecticidally effective amount of a compound of the formula



wherein R is a lower alkyl group having from 1 to 4 carbon atoms and R_1 is selected from the group of lower alkyl and lower alkoxy having from 1 to 4 carbon atoms.

4,010,264

7-[3-SUBSTITUTED ISOXAZOL-5-YL]-ACETAMIDO-CEPHALOSPORANIC ACIDS AND THEIR ANTI-BACTERIAL USE

Peter Wolfgang Henniger, Leiden, and Peter Max Smid, Delft, both of Netherlands, assignors to Koninklijke Nederlandsche Gist-en Spiritusfabriek N.V., Delft, Netherlands

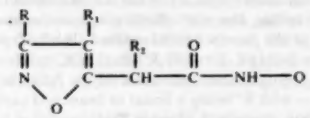
Continuation-in-part of Ser. No. 195,482, Nov. 3, 1971, Pat. No. 3,891,635. This application Dec. 17, 1974, Ser. No. 533,708

Claims priority, application United Kingdom, Nov. 6, 1970, 53040/70

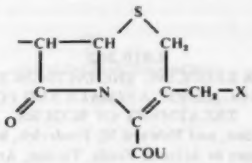
Int. Cl.² C07D 501/20; A61K 31/545

U.S. Cl. 424—246 11 Claims

1. A compound of the formula



wherein R is lower alkyl of 1 to 4 carbon atoms, R_1 is selected from the group consisting of hydrogen, lower alkyl of 1 to 4 carbon atoms, cyano, amino and chlorine, R_2 is selected from the group consisting of hydrogen, amino, lower alkyl of 1 to 4 carbon atoms, bromo and chloro and Q is



wherein X is selected from the group consisting of hydrogen, hydroxy and lower alkanoyloxy and U is OY, wherein Y is selected from the group consisting of hydrogen and non-toxic, pharmaceutically acceptable salt forming groups and alkyl of 1 to 4 carbon atoms.

4,010,265

8-ALKYLPYRIDO[3,4-d]PYRIDAZINES

Shojiro Yurugi, Kyoto, and Shintaro Kikuchi, Hyogo, both of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

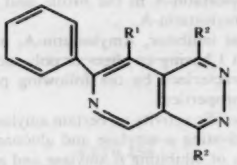
Filed Mar. 25, 1975, Ser. No. 562,032

Claims priority, application Japan, Mar. 28, 1974, 49-35255

Int. Cl.² C07D 413/14

U.S. Cl. 424—248.4 9 Claims

1. A pyrido[3,4-d]pyridazine of the formula:



wherein R^1 stands for methyl or ethyl, R^2 stands for pyrrolidino, morpholino, methyl-morpholino, ethyl-morpholino, piperidino, methyl-piperidino or ethyl-piperidino, or a pharmaceutically acceptable acid salt thereof.

9. A method of treating ascites which consists essentially of administering to a patient suffering therefrom a medicinally effective amount of a compound of claim 1.

4,010,266

PHENYLVINYL MORPHOLINE COMPOUNDS

Bernard Joseph McLoughlin, and Allen John Guildford, both of Macclesfield, England, assignors to Imperial Chemical Industries Limited, London, England

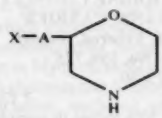
Filed Apr. 10, 1975, Ser. No. 567,011

Claims priority, application United Kingdom, May 7, 1974, 20013/74

Int. Cl.² C07D 265/30; A61K 31/535

U.S. Cl. 424—248.4 4 Claims

1. A morpholine derivative of the formula:



wherein A stands for the trans vinylene radical and X stands for a phenyl radical which is unsubstituted or which is substituted by a methyl, methoxy, ethoxy or phenoxy radical in the 2- or 4-position or by a fluorine, chlorine or bromine atom; and the pharmaceutically-acceptable acid-addition salts thereof.

4. A method of relieving depression in a warm-blooded animal which comprises administering thereto an effective amount of a compound of claim 1.

4,010,267
BENZODIOXOLE COMPOUNDS

Gilbert Regnier, Hatenay-Malabry; Roger Canevari, Villebon-sur-Yvette; Michel Laubie, Vaucresson, and Jean-Claude Poignant, Bures-sur-Yvette, all of France, assignors to Science Union et Cie, Societe Francaise de Recherche Medical, Suresnes, France

Division of Ser. No. 342,284, March 16, 1973, Pat. No. 3,917,597. This application Mar. 26, 1975, Ser. No. 562,226

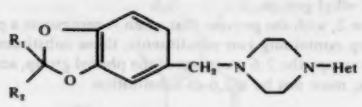
Claims priority, application United Kingdom, Apr. 7, 1972, 16098/72

Int. Cl.² C07D *295/08*

U.S. Cl. 424—250 **13 Claims**

1. A compound selected from the group consisting of:

A. benzodioxole compounds of the general formula:



wherein:

R_1 is selected from the group consisting of hydrogen and alkyl having 1 to 5 carbon atoms inclusive;

R_2 is selected from the group consisting of alkyl having 1 to 5 carbon atoms inclusive and phenyl; or

R_1 and R_2 together represent a polymethylenic chain $-(CH_2)_n-$ wherein n is selected from 4, 5 and 6; and

Het is selected from the group consisting of 2-thiazolyl, methyl-2-thiazolyl, phenyl-2-thiazolyl, and dimethyl-2-thiazolyl, and

B. physiologically tolerable acid addition salts thereof.

4,010,268
DERIVATIVES OF HEXAHYDRODIBENZOFURAN-3-ONE, THEIR PREPARATION AND USE IN PHARMACEUTICAL COMPOSITIONS

Saroop Singh Matharu, Highworth; David Alun Rowlands, Cirencester; Robert Westwood, Cricklade, and John Bodenham Taylor, Down Ampley, all of England, assignors to Roussel-UCLAF, Paris, France

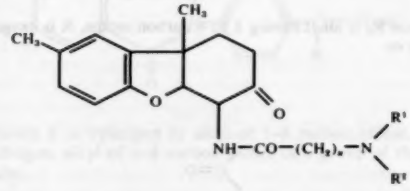
Filed Apr. 24, 1975, Ser. No. 571,236

Claims priority, application United Kingdom, Apr. 26, 1974, 18459/74

Int. Cl.² C07D *405/12*

U.S. Cl. 424—250 **9 Claims**

1. A compound of the formula:



wherein R^1 and R^2, which may be the same or different, represent methyl, ethyl, benzyl or dimethylaminoethyl groups or together with the intervening N represents a pyrrolidino, piperidino, morpholino, piperazino, or piperazino having in the 4-position a methyl, ethyl, hydroxyethyl, phenyl, benzyl, acetyl or ethoxycarbonyl group, *n* is an integer less than 6, and a pharmaceutically acceptable salt thereof.

4,010,269
ANTIVIRAL QUINAZOLINE COMPOSITIONS AND METHODS OF USE

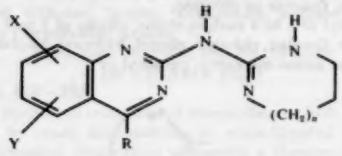
Harold E. Renis, Portage, and Louis L. Skaletzky, Kalamazoo, both of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Filed June 16, 1975, Ser. No. 586,887

Int. Cl.² A61K *31/505*

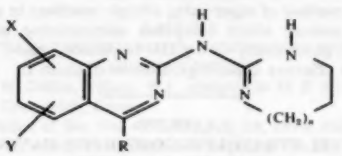
U.S. Cl. 424—251 **20 Claims**

1. A pharmaceutical composition suitable for local or topical delivery which comprises about 0.01 to about 50 mg. of a compound of the formula:



and the non-toxic pharmaceutically acceptable acid addition salts thereof, wherein X and Y are the same or different and are selected from the group consisting of hydrogen, halogen, alkyl of one to six carbon atoms, inclusive, alkoxy of one to six carbon atoms, inclusive; R is alkyl of one to six carbon atoms, inclusive; and *n* is 0 or 1, in association with a pharmaceutically acceptable carrier.

10. A method for treating viruses in a mammal, said viruses selected from the group consisting of rhinovirus, influenza, parainfluenza 1, 2 and 3 and Coxsackie A-21 which comprises locally or topically administering to the infected mammal an antiviral effective amount of a compound of the formula:



and the non-toxic pharmaceutically acceptable acid addition salts thereof, wherein X and Y are the same or different and are selected from the group consisting of hydrogen, halogen, alkyl of one to six carbon atoms, inclusive, alkoxy of one to six carbon atoms, inclusive; R is alkyl of one to six carbon atoms, inclusive; and *n* is 0 or 1, in association with a pharmaceutical carrier.

4,010,270
4-OXO-4H-PYRANO[3,2-c]QUINOLINE-2-CARBOXYLIC ACIDS AND SALTS THEREOF

Friedrich Karl Hess, Pointe Fortune, and Patrick Brian Stewart, St. Andrews East, both of Canada, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

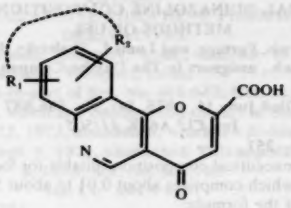
Filed Sept. 23, 1975, Ser. No. 615,912

Claims priority, application Germany, Sept. 28, 1974, 2446497

Int. Cl.² C07D *491/04*

U.S. Cl. 424—258 **7 Claims**

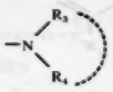
1. A compound of the formula



wherein

R_1 is alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 3 carbon atoms, fluorine or chlorine,

R_2 is alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 3 carbon atoms, fluorine, chlorine, phenyl, hydroxyl, alkyl of 1 to 3 carbon atoms-mercapto, carboxyl or



where

R_3 and R_4 are each alkyl of 1 to 4 carbon atoms or, together with each other and the nitrogen atom to which they are attached, morpholino, piperidino or methylpiperidino; or

R_1 and R_2, together with each other and when attached to adjacent carbon atoms of the benzene ring, are —CH=CH—CH=CH, —CH_2—CH_2—CH_2—CH_2— or —O—CH_2—O—;

or a non-toxic, pharmacologically acceptable salt thereof.

6. An antiallergic pharmaceutical dosage unit composition consisting essentially of an inert pharmaceutical carrier and an effective antiallergic amount of a compound of claim **1**.

7. The method of suppressing allergic reactions in a warm-blooded animal, which comprises administering topically, perorally, parenterally or by the respiratory route to said animal an effective antiallergic amount of claim **1**.

4,010,271

NOVEL PYRAZOLINE COMPOUNDS HAVING INSECTICIDAL ACTIVITY

Rudolf Mulder, and Kobus Wellinga, both of Weesp, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

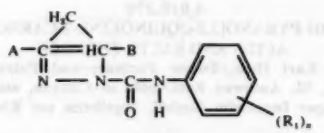
Division of Ser. No. 547,991, Feb. 7, 1975. This application May 30, 1975, Ser. No. 582,308

Claims priority, application Netherlands, Feb. 9, 1972, 7201674

Int. Cl.² A01N 9/22

U.S. Cl. 424—273 **32 Claims**

1. A biocidal composition for controlling insects and mites, said composition containing, in addition to a solid or liquid inert carrier material, an insecticidally or miticidally effective amount of a pyrazoline of the formula



wherein

A is a moiety selected from the group consisting of phenyl and phenyl substituted by 1 or 2 substituents selected from the group consisting of halogen, cyano, alkyl of from 1 to 4 carbon atoms halogenated alkyl of from 1 to 4 carbon atoms, cyclohexyl, alkoxy of from 1 to 4 carbon atoms, alkylthio of from 1 to 4 carbon atoms and amino group substituted by 1 or 2 alkyls of 1 to 4 carbon atoms; each B is a moiety selected from the group consisting of hydrogen, phenyl and phenyl substituted by from 1 to 3 substituents selected from the group consisting of halogen, alkoxy of 1 to 4 carbon atoms, alkyl of 1 to 4 carbon atoms, optionally substituted with halogen thioalkyl of 1 to 4 carbon atoms, sulfonylalkyl of 1 to 4 carbon atoms, dioxy alkylene of 1 to 4 carbon atoms and amino substituted by 1 or 2 alkyl groups each alkyl having from 1 to 4 carbon atoms;

R_1 is a moiety selected from the group consisting of a halogen atom, alkoxy of 1 to 4 carbon atoms, alkyl of 1 to 4 carbon atoms, optionally substituted with halogen, thioalkyl of 1 to 4 carbon atoms, sulfonylalkyl of 1 to 4 carbon atoms, cyano, nitro and an amino group substituted by 1 or 2 alkyl groups,

n is 1 or 2, with the proviso that when A represents a phenyl group containing two substituents, these substituents do not occupy the 2,6 positions of the phenyl group, and that $(R_1)_n$ must not be a 2,6-di-substitution.

4,010,272

ANTHELMINTICALLY ACTIVE BASICALLY SUBSTITUTED 2-CARBALKOXY-AMINO-BENZIMIDAZOLYL-5(6)-PHENYL ETHERS AND -KETONES

Heinz Loewe, Kelkheim, Taunus; Josef Urbanietz, Schwalbach, Taunus; Dieter Düwel, Hofheim, Taunus, and Reinhard Kirsch, Niederjosbach, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

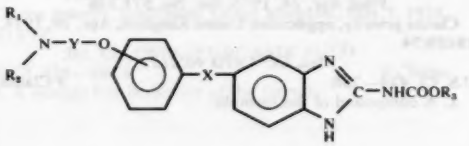
Filed Sept. 8, 1975, Ser. No. 611,325

Claims priority, application Germany, Sept. 10, 1974, 2443297

Int. Cl.² C07D 235/32

U.S. Cl. 424—273 **12 Claims**

1. A basically substituted 2-carbalkoxyamino-benzimidazolyl 5-(6)-phenyl ether or -ketone of the formula



wherein R_3 is alkyl having 1 to 4 carbon atoms, X is oxygen, sulfur or

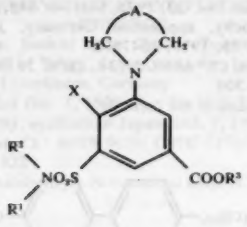
Y is a straight-chained or branched alkylene of 1 to 4 carbon atoms and R_1 and R_2 represent alkyl having 1 to 4 carbon atoms, whereby R_1 and R_2 together with the supporting nitrogen atom may also represent pyrrolidine, piperidine, morpholine or thiomorpholine, and a salt thereof with a physiologically tolerable acid.

4,010,273
5-SULFAMOYLBENZOIC ACID DERIVATIVES CARRYING A HETEROCYCLIC SUBSTITUENT

Dieter Bormann, Kelkheim, Taunus; Wulf Merkel, Neuenhain, Taunus; Roman Muschaweck, Frankfurt am Main, and Mania, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Apr. 23, 1975, Ser. No. 570,649
Claims priority, application Germany, Apr. 25, 1974, 2419970
Int. Cl.² C07D *295/14*
U.S. Cl. 424—274 8 Claims

1. A 5-sulfamoylbenzoic acid derivative carrying a heterocylic substituent and corresponding to the formula



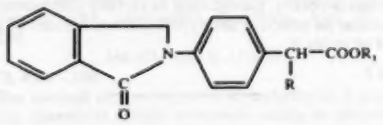
in which R^1, R^2 and R^3 are hydrogen or alkyl of 1 to 4 carbon atoms; X is phenoxy, the phenyl ring of which may be substituted by halogen, OH, NO_2, NH_2, CF_3, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 3 carbon atoms, or dimethylamino; and A is $—CH_2—CH_2—$ which may be substituted by halogen, lower alkyl, or phenyl, and the physiologically tolerated salts thereof.

4,010,274
ISOINDOLINE DERIVATIVES HAVING PLATELET ANTI-AGGREGATING ACTIVITY

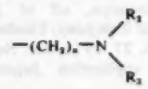
Pier Nicola Giraldi; Giuliano Nannini, both of Milan; Giovanni Riasoli, Vanese; Anna Spelta, Milan, and Aurelio Contone, Como, all of Italy, assignors to Carlo Erba, Milan, Italy

Continuation of Ser. No. 537,429, Dec. 30, 1974, abandoned, which is a continuation of Ser. No. 483,780, June 26, 1974, abandoned. This application Oct. 16, 1975, Ser. No. 622,828
Claims priority, application Italy, July 27, 1973, 27151/73
Int. Cl.² A61K *31/40*
U.S. Cl. 424—274 6 Claims

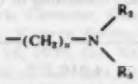
1. A method for the prevention and treatment of platelet aggregation comprising administering to a patient in need thereof of a therapeutically effective amount of a compound of the formula:



wherein R is hydrogen or alkyl of 1–4 carbon atoms, R_1 is hydrogen, alkyl of 1–4 carbon atoms or a group of the formula:



wherein *n* may be 1 or 2 and each of R_2 and R_3, being the same or different, are hydrogen or alkyl of 1–4 carbon atoms or a salt of the compound wherein R_1 is hydrogen with a physiologically acceptable base or a salt of the compound wherein R_1 is



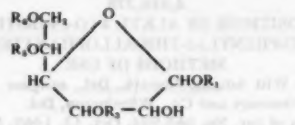
with a physiologically acceptable acid.

4,010,275
TREATMENT OF OSTEOARTHRITIS

Gerhard Wilhelmi, Reihen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Mar. 18, 1975, Ser. No. 559,608
Int. Cl.² A61K *31/34*
U.S. Cl. 424—285 7 Claims

1. A method of treatment of osteoarthritis which is characterized by orally administering to warm-blooded animals a pharmaceutical preparation containing a therapeutically effective amount of a furanoside of the formula I



(I),

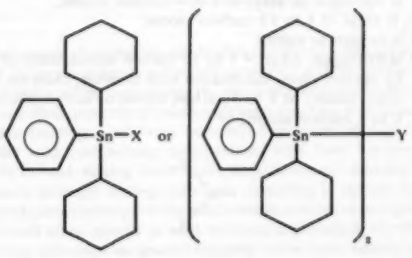
wherein R_1 is hydrogen or alkyl with up to 7 carbon atoms, and R_3, R_5 and R_6 each independently is hydrogen, alkyl with up to 7 carbon atoms, alkenyl with up to 7 carbon atoms, benzyl, halogeno-benzyl, (C_1-C_7-alkyl)-benzyl, (C_1-C_7-alkoxy)-benzyl or trifluoromethyl-benzyl.

4,010,276
CERTAIN TRIORGANOTIN COMPOUNDS USED TO COMBAT MITES

Melvin H. Gitlitz, Edison, N.J., assignor to M & T Chemicals Inc., Greenwich, Conn.

Division of Ser. No. 487,053, July 10, 1974, Pat. No. 3,923,998, which is a continuation-in-part of Ser. No. 311,509, Dec. 4, 1972, abandoned. This application June 16, 1975, Ser. No. 587,034
Int. Cl.² A01N *9/00*
U.S. Cl. 424—288 1 Claim

1. A method for killing mites by contacting the mites on their plant habitat with a composition comprising a liquid or solid inert carrier and a miticidally effective but non-phytotoxic amount of a dicyclohexylphenyltin compound of the general formula



wherein X represents a monovalent radical selected from the group consisting of chlorine, bromine, fluorine, hydroxyl,

carboxylate, phenoxy, alkoxy (-OR¹) and mercaptide (-SR²), wherein R¹ represents an alkyl radical containing between 1 and 12 carbon atoms, inclusive, R² represents a radical selected from the same group as R¹ or a phenyl radical and Y is selected from the group consisting of oxygen, sulfur and sulfate radicals.

4,010,277

SYNERGISTIC COMPOSITIONS CONTAINING A POLYOXYETHYLENE SORBITOL HEXAOLEATE AND THEIR USE

Paul Swered, and Mary Anne Girard, both of Philadelphia, Pa., assignors to Betz Laboratories, Inc., Trevose, Pa.

Continuation-in-part of Ser. No. 545,678, Jan. 30, 1975, abandoned. This application Feb. 13, 1976, Ser. No. 657,795

Int. Cl.² A01N *9/00, 9/24*

U.S. Cl. 424—298 **10 Claims**

1. A composition for controlling the growth of the microorganism Aerobacter aerogenes which comprises a mixture of 1,3-dichloroacetone oxime acetate and polyoxyethylene sorbitol hexaoleate having an average of 40 oxyethylene groups wherein the weight ratio of the acetate to the hexaoleate ranges from about 95:5 to about 5:95 respectively.

4,010,278

COMPOSITIONS OF ALKYL 4-[O-(SUBSTITUTED AMINO)PHENYL]-3-THIOALLOPHANATES AND METHODS OF USE

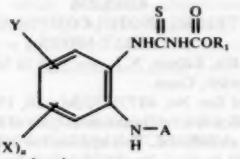
Charles De Witt Adams, Newark, Del., assignor to E. I. Du Pont de Nemours and Co., Wilmington, Del.

Division of Ser. No. 865,984, Oct. 13, 1969, Pat. No. 3,927,069. This application Apr. 20, 1972, Ser. No. 245,901

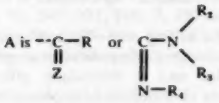
Int. Cl.² A01N *9/24*

U.S. Cl. 424—309 **10 Claims**

1. The method of preventing injury due to mites or fungi consisting essentially of applying to the locus to be protected from fungi and mites a fungicidally and mite ovicidally effective amount of a compound of the formula:



wherein



X is hydrogen, fluorine, chlorine, or bromine;
Y is hydrogen or alkyl of 1 to 4 carbon atoms;
R_1 is alkyl of 1 to 12 carbon atoms;
Z is oxygen or sulfur;
R is hydrogen, alkyl of 1 to 12 carbon atoms, alkyl of 1 to 12 carbon atoms substituted with fluorine, chlorine, bromine, alkoxy of 1 to 3 carbon atoms or acetyl; alkoxy of 1 to 4 carbon atoms; or

R_2 is hydrogen or methyl;
R_3 is hydrogen or alkyl of 1 to 4 carbon atoms;
R_4 is hydrogen or methyl;
When y is alkyl, *n* is O and when Y is hydrogen, *n* is 1, 2, or 3; and the sodium, potassium, lithium, calcium, barium, copper, zinc and manganese salts of these compounds.

4,010,279

BIPHENYLOXY DERIVATIVES AND ANTIHYPERLIPIDEMIC USE

Gerhart Griss; Wolfgang Grell; Rudolf Hurnaus, all of Biberach, Riss; Robert Sauter, Laupheim; Bernhard Eisele, Biberach, Riss; Nikolaus Kaubisch, Biberach, Riss, and Matyas Leitold, Biberach, Riss, all of Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

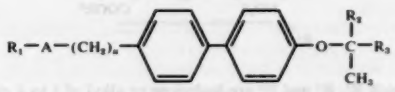
Filed Dec. 23, 1975, Ser. No. 643,700

Claims priority, application Germany, Jan. 9, 1975, 2500692; Oct. 25, 1975, 2547872

Int. Cl.² A61K *31/24;* C07C *103/84*

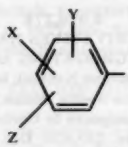
U.S. Cl. 424—309 **7 Claims**

1. A compound of the formula



wherein

R_1 is alkyl of 1 to 6 carbon atoms, cycloalkyl of 3 to 6 carbon atoms, phenylalkyl, phenylalkenyl or



where X, Y and Z are each hydrogen, halogen, alkyl of 1 to 3 carbon atoms or alkoxy of 1 to 3 carbon atoms,
R_2 is hydrogen or alkyl of 1 to 4 carbon atoms,
R_3 is alkoxycarbonyl of 2 to 7 carbon atoms or cycloalkoxycarbonyl of 4 to 8 carbon atoms,
A is —CO-NH— or —NH-Co—, and
n is 1, 2 or 3.

7. The method of lowering the level of lipids in the blood of a warm-blooded animal in need of such treatment, which comprises perorally, parenterally or rectally admininstering to said animal an effective antihyperlipidemic amount of a compound of claim 1.

4,010,280

PHENOXYALKYLAMINE DERIVATIVES AND PREPARATION THEREOF

Isamu Maruyama, Minoo; Masaru Nakao; Kikuo Sasajima, both of Toyonaka; Shigeho Inaba, Takarazuka, and Hisao Yamamoto, Nishinomiya, all of Japan, assignors to Sumitomo Chemical Company, Limited, Japan

Filed Sept. 27, 1974, Ser. No. 509,952

Claims priority, application Japan, Sept. 28, 1973, 48-109983

Int. Cl.² A01N *9/20;* C07C *91/16, 93/06*

U.S. Cl. 424—316 **6 Claims**

1. A compound selected from the group consisting of

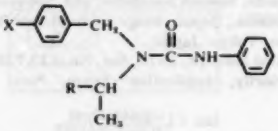
N- 2-(2-ethoxyphenoxy)ethyl -3-(4-fluorophenoxy)propylamine,
N- 2-(2-ethoxyphenoxy)ethyl -3-(4-fluorophenylthio)-propylamine,
N- 2-(2-(2-ethoxyphenoxy)ethyl -3-(4-fluoroanilino)-propylamine,
N- 2-(2-ethoxyphenoxy)ethyl -3-(N-ethyl-4-fluoroanilino)-propylamine and pharmaceutically acceptable salts thereof.

4,010,281
N-(4-HALOBENZYL)-N-BRANCHED ALKYL-N'-PHENYLUREAS AND FUNGICIDAL USE THEREOF

Yasuo Yamada; Junichi Saito; Tatsuo Tamura, and Yoshio Kurahashi, all of Tokyo, Japan, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Oct. 1, 1975, Ser. No. 618,716
Claims priority, application Japan, Oct. 7, 1974, 49-114659
Int. Cl.² A01N *9/20*; C07C *127/17*
U.S. Cl. 424—322 **12 Claims**

1. An N-(4-halobenzyl)-N-branched alkyl-N'-phenylurea of the formula



in which
R is a C_1–C_6 alkyl radical, and
X is a halogen atom.

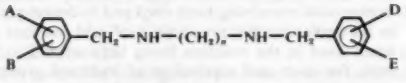
10. A fungicidal composition containing as active ingredient a fungicidally effective amount of a compound according to claim 1 in admixture with a diluent.

4,010,282
ANTI-ARRHYTHMIC AGENTS

Fritz Binnig, Fussgoennheim, and Manfred Raschack, Weisenheim am Sand, both of Germany, assignors to Knoll A.G. Chemische Fabriken, Ludwigshafen (Rhine), Germany

Filed June 25, 1975, Ser. No. 590,156
Claims priority, application Germany, Aug. 9, 1974, 2438288
Int. Cl.² A61K *31/135*
U.S. Cl. 424—330 **3 Claims**

1. The method of treating cardiac arrhythmia in a patient suffering therefrom which comprises orally or parenterally administrating a therapeutically effective amount of an N,N'-dibenzyl alkylene diamine compound of the formula



or of a salt thereof with a physiologically tolerable acid, wherein A, B, D, and E are hydrogen, chlorine, or methoxy, and *n* is 2, 3, or 4.

4,010,283
COATING METHOD IMPROVING PRESERVATION AND ENABLING OVERTASTING OF CONFECTIONERY ARTICLES WITH A BASE OF GUM ARABIC OR SIMILAR PRODUCTS

Jacques Edmond Marie Canonne, Geneva, Switzerland, assignor to Soreat S.A., Geneva, Switzerland

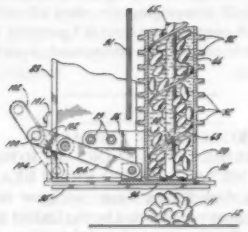
Filed Oct. 15, 1975, Ser. No. 622,645
Claims priority, application France, Mar. 5, 1975, 75.06926
Int. Cl.² A23G *1/00, 9/00*
U.S. Cl. 426—100 **5 Claims**

1. In the method for producing confection acticles having a base of gum arabic comprising molding and drying the articles in a conventional manner, the improvement in preservation and over-aromatization comprising:
after the drying step, immediately refrigerating the articles at a temperature within the range of from 0° to 10° C to give the articles a rigid consistency;
coating the refrigerated articles in at least one step with a varnish;
drying the varnish in air at a temperature lower than 20° C; and
coating with coats of sugar syrup which after drying constitute a sugar coating of noticeable thickness.

4,010,284
METHOD FOR FORMING NUT CLUSTER CONFECTIONS AND THE LIKE

Lawrence Bellew, Secane, Pa., assignor to W. C. Smith & Sons, Inc., Philadelphia, Pa.

Division of Ser. No. 357,013, May 3, 1973, Pat. No. 3,918,862.
This application Aug. 28, 1975, Ser. No. 608,737
Int. Cl.² A23L *1/09*
U.S. Cl. 426—285 **6 Claims**



1. A method of making confections of the type having solids held in an irregular free formed cluster by a fluid binder that sets upon cooling comprising the steps of continuously feeding a controlled quantity of said solids into a mixing zone, continuously feeding a separate controlled quantity of said fluid binder into said mixing zone, mixing said fluid binder and solids in said mixing zone while simultaneously moving said mixture through mixing zone and extruding it out an outlet thereof, successively cutting said extruded mixture into predetermined sized pieces as said mixture is extruded, moving a run out conveyor in spaced relation below said mixing zone outlet, and successively dropping said cut pieces of said extruded mixture onto said moving run out conveyor so that the pieces assume an irregular free formed shape.

4,010,285

CONCENTRATES FOR CARBONATED SOFT DRINKS

George A. Van Doren, Jr., Dallas, Tex., assignor to Fred M. Van Doren, Minneapolis, Minn., a part interest

Continuation-in-part of Ser. No. 490,914, July 22, 1974, abandoned, which is a continuation-in-part of Ser. No. 384,698, Aug. 1, 1973, abandoned. This application Mar. 25, 1976, Ser. No. 670,126

Int. Cl.² C02D *1/02*

U.S. Cl. 426—534 **3 Claims**

1. In an aqueous base carbonated soft drink concentrate formulation comprising an aqueous solution of a flavoring concentrate based upon natural or artificial color and natural or artificial flavor and flavoring constituents selected from the group consisting of sodium chloride, sodium gluconate, glucona delta lactone, caffeine, phosphoric acid, stannous chloride, citric acid, and sodium citrate; sodium benzoate in a concentration in said soft drink concentrate of about 0.3% by weight based upon total bottled concentrate; wherein:

a. an artificial sweetener is provided selected from the group consisting of saccharin and sodium saccharin in a concentration in said soft drink concentrate ranging from between 0.03% and 0.18% by weight based upon total bottled concentrate, and natural sugar, with from 0% to less than about 50% of the total sweetening requirement being obtained from natural sugar, depending on strength of the concentrate; and

b. carbon dioxide in a concentration ranging from greater than one up to seven volumes of carbon dioxide per volume of soft drink concentrate wherein the carbonated concentrate is prepared by introducing the carbon dioxide as a gas directly into the concentrate.

4,010,286

FLAVORING WITH 4-METHYL-1-OXASPIRO[5.5] UNDECANE

John B. Hall, Rumson; Denis E. Hruza, Sr., Brick Town, both of N.J.; Edward J. Shuster, Brooklyn, N.Y.; Manfred Hugo Vock, Locust, and Joaquin Francisco Vinals, Red Bank, both of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Continuation-in-part of Ser. No. 547,057, Feb. 4, 1975, abandoned. This application Nov. 20, 1975, Ser. No. 633,796

Int. Cl.² A23L *1/226*

U.S. Cl. 426—536 **2 Claims**

1. A process for augmenting or enhancing the aroma or taste of a foodstuff comprising the step of adding to said foodstuff from 0.5 ppm up to about 0.1 percent by weight of said foodstuff of the spiropyran compound, 4-methyl-1- oxaspiro[5.5]undecane.

4,010,287

PROCESS FOR PREPARING METAL-CARBIDE-CONTAINING MICROSPHERES FROM METAL-LOADED RESIN BEADS

Ronald L. Beatty, Oak Ridge, Tenn., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed June 18, 1974, Ser. No. 480,324

Int. Cl.² G21C *3/06*

U.S. Cl. 427—6 **4 Claims**

1. In a process for producing discrete porous spheroidal particles consisting of a dispersion of a metal carbide or oxide-carbide mixture within a carbon matrix, the improvement which comprises carbonizing a metal-loaded ion-exchange resin microsphere within a fluidized bed to create a carbonized microphere consisting essentially of a dispersion of metal oxide within a carbon matrix, coating the carbonized microsphere with a buffer carbon layer resulting from the thermal decomposition of acetylene, and then heating the coated oxide-containing microsphere at a temperature for a time sufficient to convert at least a portion of the oxide to carbide.

4,010,288

METHOD OF PREVENTING EVAPORATION OF LIQUID ON AN IMAGE-BEARING MEMBER

Ikuo Souma, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sept. 19, 1975, Ser. No. 614,962

Claims priority, application Japan, Oct. 4, 1974, 49-114367; Oct. 4, 1974, 49-114368

Int. Cl.² B05D *3/00, 1/26*

U.S. Cl. 427—15 **10 Claims**

1. A method for preventing evaporation of evaporative liquid from an endless surface of a rotatable member wherein said surface bears an electrostatic latent image or a visualized image, and wherein means are provided for supplying evaporative liquid to said surface and for removing evaporative liquid from said surface, said supplying means and said removing means being circumferentially spaced along said endless surface, said method comprising the steps of removing all evaporative liquid from said surface between said supplying means and said removing means and then stopping the rotation of said rotatable member, whereby no evaporative liquid remains on the surface of said rotatable member when said member is stopped.

4,010,289

METHOD OF MANUFACTURING SYNTHETIC RESIN FILM HAVING HIGH WRITABILITY AND PRINTABILITY

Yukio Kobayashi; Seiitiro Sakimoto, and Nobuyoshi Tanaka, all of Yokohama,, Japan, assignors to Showa Denko Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 14, 1974, Ser. No. 523,738

Claims priority, application Japan, Nov. 14, 1973, 48-127162

Int. Cl.² B05D *3/06*

U.S. Cl. 427—54 **66 Claims**

1. A method of preparing synthetic resin film of high writability and printability which comprises the steps of:

reacting together to produce unsaturated polyester compound:

1. alicyclic polybasic acids or anhydrides thereof,
2. polyepoxides containing at least two epoxy groups and
3. at least one compound selected from the group consisting of
   a. unsaturated monobasic acids,
   b. glycidyl compounds containing radical polymerisable unsaturated bonds, and
   c. unsaturated polybasic acids, the proportions of said reactants based on 1 mol of reactant (1) being 0.1 to 3.0 mols of reactant (2) and 0.1 to 2.0 mols of reactant (3);

mixing the resulting unsaturated polyester compound with fillers;

coating the resulting filler containing mixture on the surface of a base synthetic resin film; and

irradiating ultraviolet rays on the surface of the coated mixture to produce photopolymerization thereof.

2. A method of preparing a synthetic resin film of high writability and printability which comprises the steps of:

reacting together to produce an organic compound containing unsaturated group

1. a compound selected from the group consisting of
   a. polyepoxides containing at least two epoxy groups and
   b. alicyclic polybasic acids or anhydrides thereof, and
2. compounds containing both vinyl and hydroxyl groups in the molecule, the proportions of said reactant (b) when used in the reaction being between 0.5 to 1.8 mols for each mol equivalent of hydroxyl group in reactant (2) and the proportion of said reactant (2) being between 0.5 to 2.0 gram equivalent per epoxy group per molecule of any reactant (a) used in the reaction;

mixing the resulting unsaturated group containing organic compound with fillers;

coating the resulting filler containing mixture on the surface of a base synthetic resin film; and

irradiating ultraviolet rays on the surface of the coated mixture to produce photopolymerization thereof.

4,010,290

METHOD OF FABRICATING AN ENSULATED GATE FIELD-EFFECT DEVICE

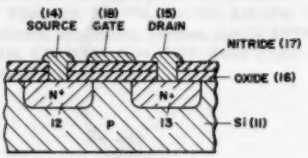
Bernard W. Boland, Scottsdale, Ariz., assignor to Motorola, Inc., Chicago, Ill.

Continuation of Ser. No. 57,401, Sept. 22, 1971, abandoned, which is a division of Ser. No. 740,967, June 28, 1968, abandoned. This application June 20, 1973, Ser. No. 371,635

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² B05D *5/12*

U.S. Cl. 427—93 **5 Claims**



N-CHANNEL ENHANCEMENT

2. A method for the manufacture of an insulated gate field-effect transistor which includes thermal growth of an oxide layer on a silicon substrate comprising the steps of:

passing a mixture of oxygen and hydrogen, in which the percentage of oxygen in the mixture is maintained within the range of 0.1% up to 4.0% by volume, in contact with the substrate while maintaining the substrate at a temperature between 800°C and 1400°C;

forming a silicon nitride layer by pyrolytic deposition on the oxide layer by passing a mixture of hydrogen, silane and ammonia in contact with the oxide and substrate while maintaining the latter at a temperature between 800°C and 1100°C.

4,010,291

METHOD OF MAKING A LOW RESISTANCE INDIUM OXIDE CONDUCTIVE FILM

Yoshiyuki Katsube, and Shizuko Katsube, both of Ikeda, Japan, assignors to Agency of Industrial Science & Technology, Tokyo, Japan

Filed Oct. 20, 1975, Ser. No. 624,189

Claims priority, application Japan, Dec. 16, 1974, 49-144804

Int. Cl.² B05D *5/12*; **C23C** *15/00*

U.S. Cl. 427—126 **4 Claims**

1. A method of making low resistance indium oxide conductive films on a substrate by a vacuum evaporation or sputtering process using indium oxide or metallic indium as starting material in a chamber having an atmosphere comprising aqueous vapor or gas mixed with aqueous vapor.

4,010,292

PROCESS FOR THE PRODUCTION OF SELF-CONTAINED CARBONLESS COPY RECORD SHEETS

Dale Richard Shackle, Box 151, Rte. 5, Scottsboro, Ala. 35768, and Gerhart Schwab, Rte. 9, Box 750, Chillicothe, Ohio 45601

Filed Aug. 28, 1975, Ser. No. 608,768

Int. Cl.² B41M *5/16*

U.S. Cl. 427—150 **21 Claims**

1. A process for making pressure sensitive sheets comprising the steps of:

a. forming a dispersion of microcapsules, said microcapsules being the product of microencapsulating a solution of a color precursor in an oil carrier, the walls of said microcapsules being substantially oil and water impermeable;

b. forming an aqueous mixture containing a color developer for said color precursor;

c. adding a color suppressant to said aqueous mixture in an amount equal to from about 0.1 percent to about 5.0 percent of the dry weight of the coating composition, said color suppressant being a nitrogen containing basic organic compound selected from the group consisting of: amines, polyethylenimines and aziridines;

d. mixing said dispersion of microcapsules and said aqueous mixture to form an aqueous coating composition; and

e. applying said aqueous coating composition to a substrate.

4,010,293

ENHANCEMENT OF IRIDESCENT COLORS TO PROVIDE VIVID COLORANTS AND PRINTING INKS

Chester Davis, 1685 Atson Lane, Cincinnati, Ohio 45205

Filed Feb. 13, 1975, Ser. No. 549,707

Int. Cl.² B05D *5/06*; **C09C** *1/28*

U.S. Cl. 427—214 **13 Claims**

1. A method of enhancing the interference reflection color of an iridescent pigment of the type comprising an essentially transparent plate-like base substrate having thereon at least one overcoating of an essentially transparent material having a refractive index which is substantially greater than that of said base substrate,

said method comprising,

applying to said iridescent pigment a solution of a solvent-soluble coloring matter which possesses an absorption band complementary to the interference reflection color of said pigment.

4,010,294

COMPLEX PHOSPHATES

James Derek Birchall; John Edward Cassidy; Nicholas Rolfe, and Clifford Granville Miles, all of Runcorn, England, assignors to Imperial Chemical Industries Limited, London, England

Division of Ser. No. 296,985, Oct. 12, 1972, Pat. No. 3,899,342. This application Apr. 24, 1975, Ser. No. 571,320

Claims priority, application United Kingdom, Oct. 19, 1971, 48576/71; June 8, 1972, 26803/72

Int. Cl.² B05D *3/02*

U.S. Cl. 427—226 **15 Claims**

1. A solid water-soluble aluminium phosphate binder which dissolves in water to form a solution containing aluminium ions, orthophosphate ions and additionally the anions of a carboxylic acid or a mineral oxyacid said ions being present in the solution in such proportions as to provide an Al:P ratio of substantially 1:1 and an additional anion:aluminium ion ratio in the range 0.5:1 to 4:1.

15. A method of coating a surface with an aluminium phosphate according to claim 1 which comprises applying to the surface a solution containing aluminium ions, orthophosphate ions and, additionally, the anions of a carboxylic acid or mineral oxyacid, the ions being present in such proportions as to provide an Al:P ratio of substantially 1:1 and an additional anion:aluminium ion ratio in the range 0.5:1 to 4:1 and decomposing the solution, by heating to provide a coating of aluminium phosphate on the surface.

4,010,295

PROCESS FOR CONTINUOUSLY BONDING STAPLE FIBERS INTO A STABLE BAND AND STABLE BAND PRODUCED ACCORDING TO THE AFORESAID PROCESS

Werner Naegeli, Winterthur, Switzerland, assignor to Pavena AG, Basel, Switzerland

Filed June 20, 1972, Ser. No. 264,622

Claims priority, application Germany, Dec. 22, 1971, 2163960

Int. Cl.² B32B *19/00, 27/02*

U.S. Cl. 428—361 **10 Claims**

1. Process of adhesively bonding hydrophilic staple fibers into a stable band, comprising the steps of introducing into a fiber arrangement composed of staple fibers an excess of a liquid containing an adhesive distributed therein, squeezing-off the excess liquid from the fiber arrangement, compacting the fiber arrangement into a moist compact by application of pressure thereto, contacting the moist band with a condensing vapor atmosphere formed from the liquid introduced into the fiber arrangement, and forming liquid from the condensing vapor atmosphere at the moist band for suppressing a sandwich-effect, and drying the band by evaporating the liquid of the band for setting the adhesive and transforming the band into the stable band.

4,010,296

COMPOSITIONS FOR IMPARTING FIRE RETARDANCE TO WOOD

William J. Oberley, 414 Cyra Drive, Monroeville, Pa. 15146

Division of Ser. No. 510,408, Sept. 30, 1974, Pat. No. 3,986,881. This application June 7, 1976, Ser. No. 693,188

Int. Cl.² B05D *3/02, 1/18*

U.S. Cl. 427—393 **2 Claims**

1. Method of treating wood to impart non-hygroscopic, leach resistant fire retardant properties thereto comprising impregnating the wood with an aqueous solution of partially reacted monomethylol dicyandiamide, melamine, and phosphoric acid wherein the solutiion has a ratio of monomethylol dicyandiamide to melamine of from about 11.5:1.0 to about 3.0:1.0 and a molar ratio of phosphoric acid to monomethylol dicyandiamide plus melamine of from about 1.0:1.0 to 1.0:1.5 and curing the impregnated wood.

4,010,297

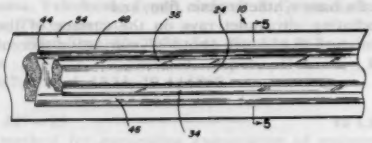
COMPOSITE DECORATIVE TRIM STRIP FOR AUTOMOBILE SIDE BODIES

Brian A. Wenrick, Dayton, Ohio, assignor to Protective Treatments, Inc., Dayton, Ohio

Filed Feb. 23, 1976, Ser. No. 660,005

Int. Cl.² B32B *7/06, 3/30;* **B60R** *13/04;* **B61F** *19/04*

U.S. Cl. 428—31 **16 Claims**

1. A trim strip structure comprising: first and second adhesively bonded plastic longitudinal body portions, said first body portion having an upper surface and a lower surface, said second body portion having an upper surface which is adhesively bonded to the lower surface of said first body portion by means of a first resilient adhesive layer underlying the lower surface of said first body portion, said second body portion having a lower surface adapted to contact and be adhesively bonded to a surface of an article to be decorated, and a second

resilient adhesive layer underlying the lower surface of said second body portion.

4,010,298

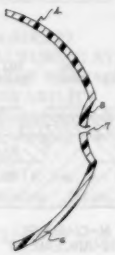
UNDERGROUND IRRIGATION DEVICES AND METHODS OF MAKING AND USING THE SAME

William M. Angle, Rte. 2, Box 249, Troy, Mo. 63379

Filed Dec. 3, 1975, Ser. No. 637,475

Int. Cl.² B29D *23/10*

U.S. Cl. 428—36 **2 Claims**



1. In a method of making perforated pipe by steps including rolling perforated flat sheet material into tubular form, the improvement comprising: indenting said flat sheet material to form a depression therein, forming a jagged edge about an aperture within said depression by punching said material from a side opposite said depression and rolling said sheet material into a tube with said depression opening exteriorly of said tube.

4,010,299

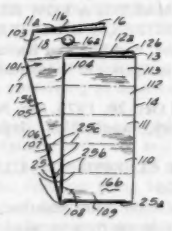
MULTI-PANEL OUTSERT FOR ATTACHMENT TO A CONTAINER

Charles J. Hershey, Jr., Libertyville, and George W. Lippincott, Zion, both of Ill., assignors to Abbott Laboratories, North Chicago, Ill., by said Hershey and Nosco, Inc., Waukegan, Ill., by said Lippincott

Filed Aug. 25, 1975, Ser. No. 607,193

Int. Cl.² B32B *3/10, 7/12;* **G09F** *3/00;* **B65D** *73/00*

U.S. Cl. 428—44 **7 Claims**



1. An outsert comprising:

a sheet form article having flat surfaces on opposite sides for bearing indicia,

at least one longitudinal fold formed in said article to partition the article into a plurality of panels overlying one another,

a through opening in each of said panels except one outside panel and

said through opening being formed near one end of said article corresponding to a top or a bottom of the article,

a plurality of parallel folds disposed at right angles to said longitudinal fold to partition the article into a plurality of panel sections overlying one another,

said parallel folds being made so that inside surface of the said outside panel is in registered adjacency with the outside surface of the outer panel on the body of the completely folded outsert through said through opening,

and an adhesive between said inside and said outside surfaces at said through opening to secure the folded panels into an integral unit.

4,010,300
HEAT WELDED JOINTS BETWEEN WEBS OF REINFORCED PLASTIC FOIL

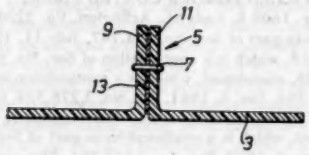
Erik Wilhelm Wallin, Gamleby, Sweden, assignor to Barracudaverken Aktiebolag, Djursholm, Sweden

Filed Jan. 3, 1974, Ser. No. 430,406

Claims priority, application Sweden, Jan. 3, 1973, 7300082

Int. Cl.² B32B *3/04, 7/08;* **E04F** *13/00*

U.S. Cl. 428—61 **8 Claims**



1. A cover comprising at least two elongated webs of reinforced plastic foils for use as a stretched ceiling cover with each web having edges extending in the elongated direction of the web and with the surfaces of said webs disposed in generally planar relationship and the elongated edges of said webs disposed in parallel relation, wherein the improvement comprises that the elongated edges of said webs being bent out of the plane of said webs and extending angularly outwardly from the plane of said webs, adjacent said elongated edges on adjacent webs being disposed in contacting relationship and heat welded together along their lengths forming a heat welded joint therebetween, means extending through the outwardly bent portions of said elongated edges of said webs forming the heat welded joint for securing the outwardly bent portions together, and said means positioned at spaced intervals along the length of the joint for reinforcing the joint.

4,010,301
CARPET TILE

Ray C. Anderson, and Joseph H. Kyle, both of LaGrange, Ga., assignors to Carpets International-Georgia (Sales), Inc., LaGrange, Ga.

Continuation-in-part of Ser. No. 524,813, Nov. 18, 1974, abandoned. This application Apr. 9, 1976, Ser. No. 675,341

Int. Cl.² D03D *27/00;* **D04H** *11/00;* **D05C** *17/00*

U.S. Cl. 428—95 **20 Claims**

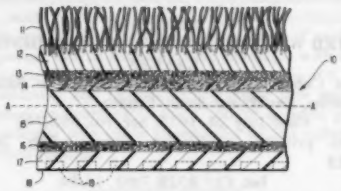
1. A carpet tile comprising

a facing portion including carpet pile projecting from said facing and a layer of resilient thermoplastic material;

a first stiffening and stabilizing portion of glass fibers;

an intermediate stabilizing layer consisting essentially of from about 70 to about 90 weight percent non-woven glass fibers and concomitantly, from about 30 to about 10 weight percent of a polyester;

a resilient backing portion including a second stiffening and stabilizing portion of glass fibers and a layer of resilient thermoplastic material; and



said carpet tile including a layer of resilient thermoplastic material between said stiffening and stabilizing portions of glass fibers, said stiffening and stabilizing portions of glass fibers providing substantial heat shielding effects to the carpet tile.

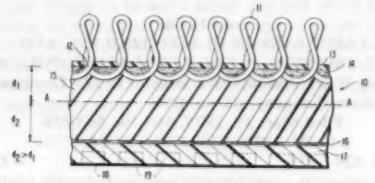
4,010,302
TUFTED FACE CARPET TILE

Ray C. Anderson, and Joseph H. Kyle, both of Troup County, Ga., assignors to Carpets International-Georgia (Sales), Inc., LaGrange, Ga.

Continuation-in-part of Ser. No. 524,813, Nov. 18, 1974, abandoned. This application Apr. 12, 1976, Ser. No. 675,888

Int. Cl.² D03D *27/00;* **D04H** *11/00;* **D05C** *17/00*

U.S. Cl. 428—95 **16 Claims**



1. A tufted face carpet tile comprising:

a facing portion including tufted carpet yarn projecting from said facing portion, a primary backing portion and a first stiffening and stabilizing portion of glass fibers;

a resilient backing portion including a second stiffening and stabilizing portion of glass fibers and a layer of resilient thermoplastic material; and

said carpet tile including a layer of resilient thermoplastic material between said stiffening and stabilizing portions of glass fibers, said stiffening and stabilizing portions of glass fibers providing substantial heat shielding effects to the carpet tile.

4,010,303
TUFTED CARPET WITH WOVEN RIBBON BACKING OF POLYAMIDE AND POLYESTER

Otto Ramsauer, Wuppertal; Heribert Dau, Elsenfeld; Willi Gumbmann, Obernburg, and Ulrich Schulze, Immenstadt, all of Germany, assignors to Akzona Incorporated, Asheville, N.C.

Filed Apr. 14, 1976, Ser. No. 676,845

Claims priority, application Germany, Apr. 16, 1975, 7512027[U]

Int. Cl.² B32B *3/02, 33/00*

U.S. Cl. 428—95 **5 Claims**

1. Tufted nylon carpet having a backing of ribbon-shaped warp and filling yarns having a reduced splitting tendency comprising a matrix-fibril structure of a mixture of 65 to 80%

by weight polyamide and 20 to 35% by weight polyester, wherein the matrix consists of polyamide and the fibrils, consisting of polyester, are discontinuous.

4,010,304

HEATED WINDOWS HAVING VACUUM-DEPOSITED LAYERS

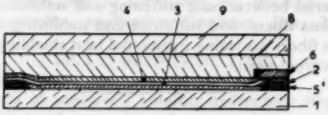
Sabatino Cohen, Sceaux, France, assignor to Saint-Gobain Industries, Neuilly-sur-Seine, France

Filed July 24, 1975, Ser. No. 598,740

Claims priority, application France, July 26, 1974, 74.26023

Int. Cl.² B32B *7/02, 15/04*

U.S. Cl. 428—213 **12 Claims**



1. A glazing comprising a glass sheet coated with an auxiliary dielectric anchoring layer, a metallic layer in contact with the anchoring layer, and a second auxiliary dielectric layer in contact with the metallic layer, in which at least one of the dielectric layers is formed of a deposit of a trioxide of tungsten or molybdenum.

4,010,305

LAMINATES OF PLASTICIZED PVC AND ACRYLONITRILE: ALKYL ACRYLATE COPOLYMERS

Jin-Liang Wang, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Mar. 31, 1975, Ser. No. 563,756

Int. Cl.² B32B *7/10, 27/22, 27/26, 27/30*

U.S. Cl. 428—215 **4 Claims**

1. A composite consisting of a polyvinyl chloride containing 20 to 100 parts of plasticizer and one to 50 parts of a polyisocyanate composition for each 100 parts of polyvinyl chloride adhered to a copolymer of 60 to 30 parts of acrylonitrile and 40 to 70 parts of alkylacrylate or alkyl methacrylate where the alkyl radical contains 1 to 30 carbon atoms.

4,010,306

PROCESSES FOR IMPREGNATING AND COATING TRIAXIAL WEAVE FABRICS

Joseph P. Fagan, Huntington, Conn., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed June 2, 1975, Ser. No. 582,792

Int. Cl.² B05D *7/22*

U.S. Cl. 428—236 **2 Claims**

2. A laminate consisting of: lightweight nonwoven sheet structure based on continuous filament synthetic organic fiber, laminated to a triaxial weave fabric; being impregnated and coated with a polymeric composition,

wherein the triaxial weave fabric is selected from the group of glass, polyester, plyamide, or aromatic aramide; and weighs no more than about two ounces per square yard;

the sheet structure is of a yarn selected from the group of polyester or polypropylene, and weighs no more than about 0.5 ounces per square yard and has a thickness of no more than about 3 mil; and

the polymeric composition is selected from the group of polychloroprene, chlorosulfonated polyethylene, polyurethane, or polyvinylchloride.

4,010,307

COATING OF PAPER, CARDBOARD AND THE LIKE AND COMPOSITION

Pierre Canard, Versailles, and Albert Levy, Orly, both of France, assignors to Rhone-Progil, Courbevoie, France

Filed Nov. 13, 1974, Ser. No. 523,368

Claims priority, application France, Nov. 15, 1973, 73.40635; Mar. 1, 1974, 74.07018; Oct. 2, 1974, 74.33180

Int. Cl.² B32B *5/16;* **D21H** *1/28*

U.S. Cl. 428—327 **5 Claims**

1. A composition for coating paper, cardboard and the like, consisting essentially of an aqueous dispersion of a binder and a pigment in which 70 to 95% by weight of the pigment is calcium carbonate particles having a size within the range of 0.6 to 2 microns and 5 to 30% by weight of the pigment comprises particles of a non-filmogenic synthetic polymer which is insoluble in the binder, the particles of non-filmogenic synthetic polymer being dimensioned within the range of 0.05 to 0.30 microns in which the binder is selected from the group consisting of starches, proteins, casein, polyvinyl alcohol, styrene-butadiene copolymers, alkyl acrylate - styrene copolymers, alkyl acrylate - vinyl acetate copolymers and vinyl acetate homopolymers, and in which the non-filmogenic synthetic polymer is selected from the group consisting of aromatic polyvinyl compounds, polyolefins, polyhaloolefins, polyesters and polysulphones.

4. Paper and cardboard coated with the composition claimed in claim 1.

4,010,308

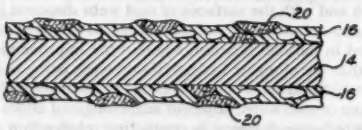
FILLED POROUS COATED FIBER

Sol B. Wiczer, 1600 S. Eads St., Arlington, Va. 22202

Continuation-in-part of Ser. No. 871,747, July 11, 1969, Pat. No. 3,889,038, which is a continuation of Ser. No. 515,806, Dec. 21, 1965, abandoned, which is a continuation-in-part of Ser. No. 157,591, Dec. 6, 1961, Pat. No. 3,278,328, which is a continuation-in-part of Ser. No. 777,344, Dec. 1, 1958, abandoned, which is a continuation-in-part of Ser. No. 353,003, May 4, 1953, Pat. No. 2,862,284. This application June 9, 1975, Ser. No. 584,934

Int. Cl.² A46B *1/00;* **B32B** *15/00;* **D02G** *3/00*

U.S. Cl. 428—372 **11 Claims**



1. A fiber comprising a fibrous core substance having a foamed coating thereon selected from the group consisting of thermoplastic and thermo-setting resins, the foamy surface being interrupted with open pores of said foam, at least said open pores being filled with a member of the group consisting of a gas applied under pressure, a liquid, solid particles and mixtures thereof.

4,010,309

WELDING ELECTRODE

Walter Adrian Petersen, Ridgewood, N.J., assignor to The International Nickel Company, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 477,900, June 10, 1974, abandoned, which is a continuation-in-part of Ser. No. 386,488, Aug. 8, 1973, abandoned. This application Oct. 30, 1975, Ser. No. 627,238

Int. Cl.² B32B *15/00;* **B23K** *35/34*

U.S. Cl. 428—386 **17 Claims**

1. A flux composition adapted to provide all-position covered electrode welding capability consisting essentially of, in weight percent from about 10% to about 26% calcium carbonate, from about 5% to about 20% barium carbonate, from

about 10% to about 23% titanium dioxide, up to about 4% aluminum oxide, from about 24% to about 26% cryolite, from about 10% to about 18% manganese, from about 1.8% to about 7.2% columbium, and chromium present in an amount up to about 10%.

4. An all-position welding electrode having a core wire containing, by weight, up to about 1% carbon, up to about 15% manganese, up to about 50% chromium, up to about 5% titanium, up to about 2% aluminum, up to about 70% iron, up to about 90% copper, up to about 10% molybdenum, up to about 6% columbium and the balance essentially nickel, and a flux coating consisting essentially of, in parts by weight of the dry flux, about 10 to about 26 parts calcium carbonate, about 5 to about 20 parts barium carbonate, about 10 to about 23 parts titanium dioxide, up to about 4 parts aluminum oxide, from about 24 to about 26 parts cryolite, about 10 to about 18 parts manganese, about 2.4 to about 7.2 parts columbium and up to about 10 parts chromium.

10. A flux composition adapted to provide covered electrode welding capability consisting essentially of, in weight percent from about 10% to about 26% calcium carbonate, from about 5% to about 20% barium carbonate, from about 10% to about 23% titanium dioxide, up to about 4% aluminum oxide, from about 20% to about 30% cryolite, from about 4% to about 18% manganese, from about 2.4% to about 7.2% columbium, and chromium present in an amount up to about 10%.

14. An all-position welding electrode having a core wire containing, by weight, up to about 1% carbon, up to about 15% manganese, up to about 50% chromium, up to about 5% titanium, up to about 2% aluminum, up to about 70% iron, up to about 90% copper, up to about 10% molybdenum, up to about 6% columbium, up to about 3% silicon, and the balance essentially nickel, and a flux coating consisting essentially of, in parts by weight of the dry flux, about 10 to about 26 parts calcium carbonate, about 5 to about 20 parts barium carbonate, about 10 to about 23 parts titanium dioxide, up to about 4 parts aluminum oxide, about 24 to about 26 parts cryolite, about 4 to about 18 parts manganese, about 1.8 to about 7.2 parts columbium, up to about 10 parts chromium, up to about 2 parts chromium oxide, and up to about 7.2 parts molybdenum.

4,010,310
MAGNETIC POWDER

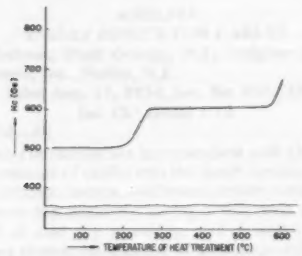
Yuichi Kubota; Shinji Umeki, and Yasumichi Tokuoka, all of Tokyo, Japan, assignors to TDK Electronics Company, Limited, Tokyo, Japan

Continuation of Ser. No. 446,750, Feb. 28, 1974, abandoned. This application July 21, 1975, Ser. No. 597,636

Claims priority, application Japan, Mar. 20, 1973, 48-31486

Int. Cl.² H01F *1/36*

U.S. Cl. 427—403 **5 Claims**



1. A magnetic powder prepared by a process, which consists essentially of:

mixing a cobalt compound selected from the group consisting of $CoCl_2 \cdot 6H_2O$, $CoSO_4 \cdot 6H_2O$, $Co(NO_3)_2 \cdot 4H_2O$, $Co(OH)_2$ and CoO and 1–10 mole percent of a complexing agent selected from the group consisting of oxy acids containing a hydroxyl group and a carboxyl group or a salt thereof, ethylenediamine, ethylenediaminetetraacetic acid, acetylacetone, pyridine, dipyridyl, hydrazine, ammonia and derivatives thereof per mole of said cobalt compound, which form a cobalt complex, with acicular iron oxide characterized by a Fe^{+2}/Fe^{+2} ratio of 0.1–0.35; and isolating and heating said acicular iron oxide at a temperature from 200°–500° C under an inert gas such that acicular iron oxide is obtained having cobalt oxide adsorbed thereon.

4,010,311
IMPACT-RESISTANT GLASS-POLYESTERURETHANE LAMINATES

Charles W. Lewis, Pittsburgh, and Earl E. Parker, Allison Park, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Sept. 14, 1973, Ser. No. 397,507

Int. Cl.² B32B *27/40*; C08G *63/12*

U.S. Cl. 428—424 **21 Claims**

1. An optically clear laminate, comprising a sheet of relatively rigid, transparent material bonded to a sheet of thermoplastic, transparent polyesterurethane consisting essentially of the reaction product of (a) hydroxy-terminated polyester composition that is the esterification reaction product of an aliphatic dicarboxylic acid containing from 4 to 10 carbon atoms and an aliphatic diol containing from 4 to 8 carbon atoms, said polyester composition having a number average molecular weight of between about 500 and about 800 and containing no more than about 7 percent by weight residual, unreacted aliphatic diol, and (b) dinuclear cycloaliphatic diisocyanate, the mole ratio of diisocyanate to polyester being such that said polyesterurethane is substantially free of unreacted isocyanate groups.

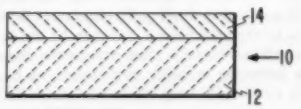
4,010,312
HIGH RESISTANCE CERMET FILM AND METHOD OF MAKING THE SAME

Harry Louis Pinch; Benjamin Abeles, both of Princeton, and Jonathan Isaac Gittleman, Trenton, all of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Jan. 23, 1975, Ser. No. 543,629

Int. Cl.² B32B *9/06, 3/06*

U.S. Cl. 428—450 **15 Claims**

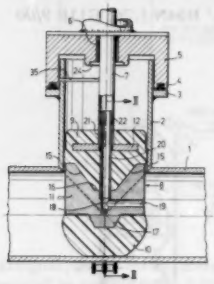


1. An article of manufacture comprising a high resistance cermet film on a refractory substrate, said cermet film being composed of a metal and a refractory insulator, said metal being selected from the group consisting of molybdenum, tungsten, cobalt and nickel, said metal being in the form of particles having an average diameter of from about 30 A to about 120 A, said film having a metal percent volume of less than about 50 per cent, said cermet film having been annealed in a reducing atmosphere wherein the resistivity of said cermet film is increased without an increase in the temperature coefficient of resistivity.

4,010,313
DEVICE FOR EFFECTING A GASTIGHT CLOSURE

Helmut Marchhart, Landeck, Austria, assignor to Donau Chemie Aktiengesellschaft, Vienna, Austria

Filed Feb. 25, 1976, Ser. No. 661,298
Claims priority, application Austria, Mar. 4, 1975, 1643/75
Int. Cl.² F27D *3/00*; **H05B** *7/06*
U.S. Cl. 13—33 **11 Claims**



1. A device for effecting a gastight closure of an inner tube of a hollow electrode of an electrothermal smelting furnace, comprising a stub tube attached to the inner tube with the axis of the stub tube being substantially perpendicular to the axis of the inner tube; a deformable closure plug of elastomeric material so disposed as to be movable by means of an actuator rod from a position within the stub tube and clear of the flow path through the inner tube, to a position in the inner tube and for sealing whereby it is capable of being forced by pressure on the actuator rod so that the plug expands into sealing contact with the inner wall of the inner tube, the plug containing an embedded pressure transmitter body of rigid material which subdivides the plug into an end section which forms a closed sealing zone of elastomeric material lying against the inner wall of the inner tube, and a section at an end adjacent the stub tube which forms a closed sealing zone of elastomeric material lying against the inner wall of the stub tube, the two sealing zones lying substantially perpendicular to one another and being interconnected; and the actuator rod being coupled directly to the section of the plug which is at the end adjacent the stub tube and being coupled indirectly via this section and the pressure transmitter body to the end section of the plug.

4,010,314
INSERT DEVICE FOR CABLES

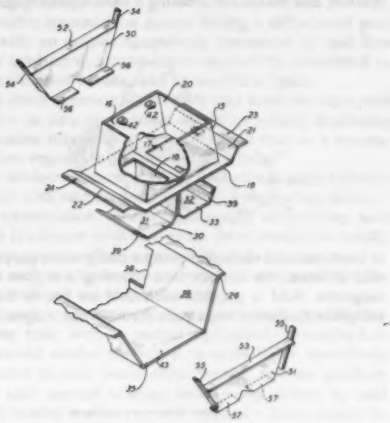
John E. Kohaut, West Orange, N.J., assignor to Raceway Components, Inc., Nutley, N.J.

Filed Aug. 15, 1974, Ser. No. 497,551
Int. Cl.² H02G *3/12*
U.S. Cl. 174—48 **14 Claims**

1. An insert device for use in connection with a cable source means for passage of cables into the insert device, said source having registration means, said insert device comprising:

a. an insert top assembly having a side wall defining the height of said top assembly, said assembly having an opening therein for passage of cables therethrough, and including plate means at the bottom of said top assembly having means extending upwardly therefrom in spaced relation to the sidewall and offset from the plane of said plate means, for registration with the cable source means, and

b. an insert bottom assembly comprising a dividing barrier device for registration with the cable source means for

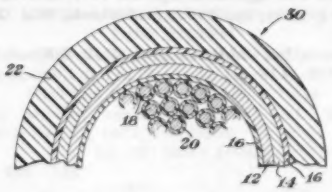


separate passage of the cables therethrough and thence through the insert top assembly.

4,010,315
SHIELDING TAPE FOR CABLES

Raymond C. Mildner, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed Apr. 25, 1975, Ser. No. 571,839
Int. Cl.² H01B *7/22*
U.S. Cl. 174—107 **30 Claims**



21. A cable for the transmission of electric power or communications comprising a core including insulated conductor means, a shield completely surrounding the circumference of said core and an outer jacket of insulation over the outside of said shields, said shield comprising a tape having a first layer of substantially pure aluminum bonded to a second layer of aluminum alloy, said aluminum alloy having an elongation to break of at least about 15 percent, a yield strength of at least about 13,000 pounds per square inch, a brinell hardness of at least about 30 and an electrolytic solution potential within about 0.05 volts of the substantially pure aluminum on the basis of N/10 calomel electrodes.

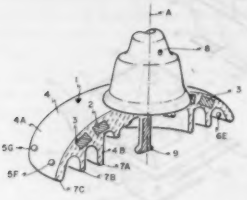
4,010,316
HIGH VOLTAGE ELECTRICAL INSULATOR HAVING MAGNETIC ELEMENTS TO PREVENT FLASHOVER

David C. Jolly, Boston, and Daniel J. King, Allston, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Mar. 12, 1976, Ser. No. 666,368
Int. Cl.² H01B *17/42*
U.S. Cl. 174—140 R **16 Claims**

13. An insulator that comprises, in combination, an electrically insulating skirt or shed or shell formed in such a way that an arc in the course of flashover with respect to the skirt or

shred or shell must occur by moving generally radially across one surface of the skirt or shed or shell to the other surface thereof; and means for creating a closed-path magnetic field at



at least one said surface, having a component perpendicular to said at least one surface and creating a region wherein the magnetic field is present such that an arc in the course of incipient flashover must pass through the magnetic field.

4,010,317

APPARATUS FOR READING A RECORD CARRIER IN WHICH INFORMATION, FOR EXAMPLE VIDEO AND/OR AUDIO INFORMATION, IS RECORDED IN AT LEAST ONE TRACK

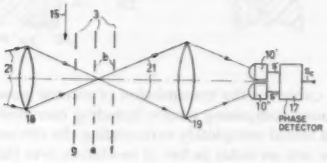
Gijsbertus Bouwhuis, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 340,977, March 14, 1073, abandoned. This application Apr. 16, 1975, Ser. No. 568,708

Claims priority, application Netherlands, Mar. 29, 1972, 7204204

Int. Cl.² H04N *5/76;* **G11B** *7/00*

U.S. Cl. 358—127 **8 Claims**



1. In an apparatus for reading a record carrier in which information is recorded in at least one optically interogatable longitudinally moving track, a focus detection system comprising a source of radiation providing a read beam of radiation, at least two optical detection elements spaced along the longitudinal direction of said track for converting optically modulated light into electrical signals, a lens system means in the path of said read beam for focussing said read beam to a radiation spot on said track that is substantially the same size as the smallest recorded detail on said record carrier whereby said information on said track modulates said read beam and for converging the radiation beam modulated by said track towards said two optical detection elements, whereby said optical detection elements receive radiation modulated by different portions of said track when said read beam is improperly focussed, and a phase detector connected to said at least two optical detection elements for measuring the phase difference between said electrical signals from said optical detection elements, said phase difference indicating the extent of the improper focus of said read beam on said track.

4,010,318

PROBE FORMING ELECTRON OPTICAL COLUMN HAVING MEANS FOR EXAMINING MAGNIFIED IMAGE OF THE PROBE SOURCE

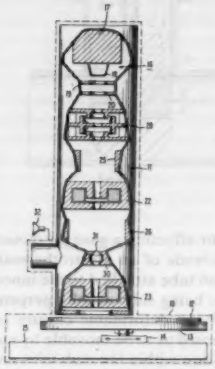
George Herbert Needham Riddle, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Sept. 15, 1975, Ser. No. 613,535

Claims priority, application United Kingdom, May 20, 1975, 21550/75

Int. Cl.² H04N *5/76;* **G11B** *9/00*

U.S. Cl. 358—178 **10 Claims**



1. A dual mode electron optical column apparatus operable in either a probe or a setup mode comprising:

1. a source of providing a beam of electrons along a path toward an object surface to be probed;
2. means for providing a demagnified image of the source on the object surface when the electron optical column apparatus is in the probe mode;
3. means for providing a magnified image of the source in an image plane when the electron optical column apparatus is in the setup mode;
4. means, including sampling means selectively subject to location in the image plane in the path of the electron beam and subject to removal from the path, for determining the current density of the portion of the magnified image which is intercepted by the sampling means when the sampling means is located in the image plane in the path of the electron beam while the electron optical column apparatus is in the setup mode; and
5. means for varying the position of the magnified image of the source in the image plane relative to the sampling means while the sampling means is located in the path of the electron beam to permit determination of the current distribution of the magnified image by the current density determining means as various portions of the magnified image are, a seriatim, intercepted by the sampling means.

4,010,319

SMEAR REDUCTION IN CCD IMAGERS

Peter Alan Levine, Trenton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Nov. 20, 1975, Ser. No. 633,689

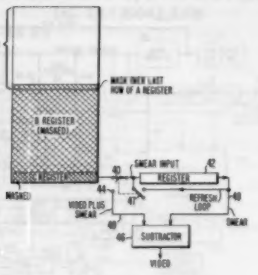
Int. Cl.² H04N *5/38;* **H01L** *29/78*

U.S. Cl. 358—213 **13 Claims**

1. In a CCD imager of the type having an imaging region onto which an image is projected for producing a charge pattern field and in which, after the pattern is produced, it is transferred out of the imaging region while the image remains projected thereon, whereby smear charge signals are produced during such transfer, and wherein the transferred pat-

tern is subsequently read-out, a method for substantially reducing the effect of the smear charge signals comprising the steps of:

producing a signal pattern representing the smear charge signal pattern present in one line of a field;



storing that signal pattern for an interval equal to at least the time required to read out the following lines of a field; and

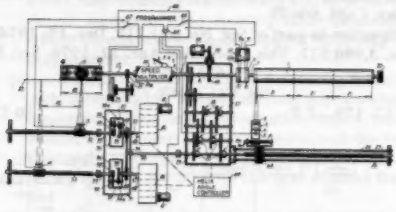
as said following lines of said field are read-out, subtracting from the line of charge signals being read the stored signal pattern.

4,010,320

DRUM RECORDING MEANS WITH DUAL SCANNING HEADS

Hans Kudlich, Kufstein, Austria, assignor to Schablonen Technik Kufstein Ges.m.b.H., Kufstein-Schaftenau, Austria

Continuation-in-part of Ser. No. 402,826, Oct. 2, 1973, abandoned. This application July 25, 1975, Ser. No. 599,054
Claims priority, application Austria, Oct. 6, 1972, 8630/72
Int. Cl.² H04N 1/06
U.S. Cl. 358—289 **7 Claims**



1. An apparatus for reproducing a pattern on a recording medium, said apparatus comprising:

a master cylinder adapted to carry said pattern and having an axis;

a copy cylinder adapted to carry said recording medium and having an axis, said copy cylinder being subdivided into a plurality of axially adjoining zones each adapted to receive a replica of said pattern;

main drive means connected to both of said cylinders for continuously jointly rotating same about their respective axes;

reading means including first and second reading heads axially spaced and axially displaceable along said master cylinder in a forward direction for scanning said pattern along a respective first set of helixes;

scribing means connected to said reading means and axially displaceable along said copy cylinder for replicating said pattern at least once in each of said zones by marking said medium along a second helix extending over all of said zones;

a first reader leadscrew parallel to the axis of said master cylinder and coupled with said first reading head for displacing same;

a first reader transmission means having a differential gear train with an output operatively connected to said first reader leadscrew, a main input operatively connected to said main drive means, and an auxiliary input;

auxiliary drive means coupled with said auxiliary input and effective in one operational mode for axially displacing said reader means at a predetermined rate in a reverse direction opposite said forward direction;

a scriber leadscrew parallel to the axis of said copy cylinder coupled with said scribing means for displacing same;

scriber transmission means operatively connecting said scriber leadscrew with said main drive means for axially displacing said scriber means with said drive means;

a second such reader leadscrew adjacent and parallel to the first-mentioned reader leadscrew;

a second such reader transmission means having a differential gear train with an output operatively connected to said second reader leadscrew, a main input operatively connected to said main drive means, and an auxiliary input; said second reading head being driven by said second reader leadscrew, said auxiliary drive means including first and second servomotors respectively connected to the auxiliary inputs of said first and second reader transmission means; and

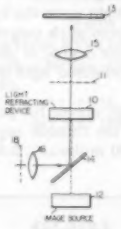
switching means for alternately connecting said reading heads to said scribing means and for alternately operating said motors to drive the head not connected to said scribing means in said reverse direction at a speed in excess of its speed in said forward direction to restore the axial spacing of said reading heads for further displacement thereof in said forward direction.

4,010,321

LIGHT MODULATING DEVICE USING SCHLIEREN LENS SYSTEM

Tadao Kohashi, Kawasaki, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Oct. 19, 1973, Ser. No. 407,834
Claims priority, application Japan, Oct. 20, 1972, 47-105491; Dec. 12, 1972, 47-125596
Int. Cl.² H04N 5/66
U.S. Cl. 358—233 **39 Claims**



1. A light modulating device comprising: a support; a layer of electrokinetically mobile liquid on said support; and a pair of electrodes extending parallel to said liquid layer and adapted to be biased at potentials of opposite polarities, one of said electrodes adjacent said liquid layer being provided with a plurality of apertured regions to produce electric fields therein, a portion of each electric field extending parallel to said liquid layer to produce therein a plurality of lateral flows of current to disturb surface contour of the liquid.

18. A light modulating device comprising an electrokinetic mobile liquid, and means including a photoelectrical conversion surface for supporting the liquid in the form of layer, the conversion surface having discrete regions in electrical contact with the liquid layer and sensitive to an imagewise

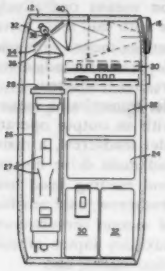
radiation incident thereon to produce lateral current flows in said liquid layer.

4,010,322

HIGH RESOLUTION LOW BANDWIDTH PORTABLE TELECOMMUNICATION SYSTEM

Harvey C. Nathanson, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed July 28, 1975, Ser. No. 599,492
Int. Cl.² H04N *5/64, 5/74*
U.S. Cl. 358—233 **5 Claims**



1. A high resolution telecommunicator display receiver comprising:

a. input signal receiver means;

b. a high resolution cathode ray tube, which includes a light transmissive faceplate from which is closely internally spaced an electrostatically deflectable, light reflective, light valve array target;

c. the light array target includes an array of spaced apart, individually electronic charge addressable members which are deflectable as a function of an electronic charge thereon;

d. cathode ray tube drive means connected between the input signal receiver means and the cathode ray tube for establishing an electron charge pattern on the light valve target array corresponding to the communicated display image input signal, which charge pattern is maintained thereon without additional power input;

e. display image readout means comprising optical means and a light source coupled to the cathode ray tube faceplate for projecting light upon the light valve target, with the reflected light from such target being modulated in correspondence to the degree of deflection of individual light valves, which reflected light is focused in an image viewing plane;

f. integral power supply means for providing power to the receiver means and the cathode ray tube drive means, of less than about 5000 milliwatts, and power for the light source.

4,010,323

DIGITAL TIMING RECOVERY

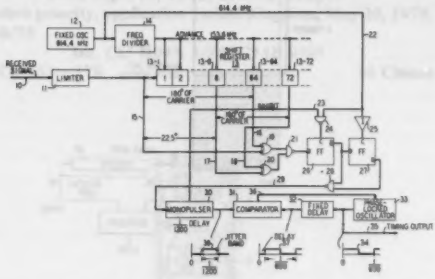
Richard John Peck, Eatontown, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Oct. 29, 1975, Ser. No. 626,658
Int. Cl.² H04L *7/00, 27/22*
U.S. Cl. 178—88 **6 Claims**

5. In combination with a demodulator for synchronous phase-shift-keyed digital data signals modulated on a carrier wave of substantially constant frequency, said demodulator including a delay medium storing a plurality of samples of a received wave extending over more than a half-cycle of said carrier wave,

first means for comparing phases measured between pairs of samples points on said delay medium, each pair separated by integral half-cycles of said carrier wave, a failure of comparison being indicated by a change of state in the output of said comparing means,

monostable pulsing means triggered by said first comparing means to provide output pulses related to the synchronous data signaling rate, and



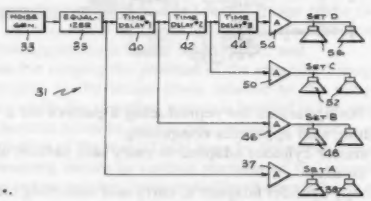
phase-locked oscillator means having a nominal frequency equal to that of the synchronous data signaling rate and a phase controlled by a second means for comparing responsive to said nominal frequency and said output pulses from said monostable means.

4,010,324

BACKGROUND NOISEMASKING SYSTEM

John P. Jarvis, 19120 Nordhoff St., Northridge, Calif. 91324, and Ludwig W. Sepmeyer, 1862 Comstock Ave., Los Angeles, Calif. 90025

Continuation-in-part of Ser. No. 534,214, Dec. 19, 1974, Pat. No. 3,980,827. This application Apr. 12, 1976, Ser. No. 675,770
Int. Cl.² H04R *3/00*
U.S. Cl. 179—1 P **10 Claims**



1. A system for noisemasking having a noise generation and masking system comprising of:

a single noise generator for producing random noise;

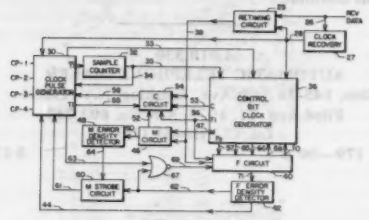
a single equalizer connected to the output of said noise generator for producing electronic noise signals equivalent to equalized non-delayed audio noise in a first channel; and

means connected to said first channel for receiving the equalized audio noise electronic signal and for introducing a first time delay therein to produce a second channel and for introducing a second time delay therein for producing a third channel of equalized audio noise electronic signals, each channel driving selected speakers of an array.

4,010,325
FRAMING CIRCUIT FOR DIGITAL SIGNALS USING EVENLY SPACED ALTERNATING FRAMING BITS

Ralph LeRoy Kline, Los Altos, Calif., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Oct. 30, 1975, Ser. No. 627,323
Int. Cl.² H04J *3/06*
U.S. Cl. 179—15 BS **9 Claims**



1. In a digital multiplexer system wherein a plurality of lower-speed bit streams are combined in a single high-speed bit stream for transmission, the high-speed bit stream containing information bits, stuffed bits, and signaling bits, said signaling bits further including evenly spaced winking framing bits, apparatus for reframing which comprises:

means for deriving timing information from said high-speed bit stream;

framing error detection means responsive to the received high-speed bit stream and to said timing informatiion means for detecting errors in the framing pattern, said error detection means providing an error output signal for each error occurrence, within a predetermined time after the last error occurrence, only after a predetermined number of errors have occurred, said error output signals initiating a reframing cycle;

means for counting a predetermined number of bits in said high-speed bit stream and providing a first output signal in the time slot following the last bit in the predetermined count, said counting means being also responsive to error output signals of said framing error detection means, which signals cause signal outputs following said first output signal;

preview means, including means for storing the bit immediately following the framing bit, said preview means being responsive to the timing information means, the counting means, the framing detection means, and the high-speed bit stream, said preview means including means for comparing the preview bit with the next winking framing bit; and

means responsive to the output of said preview means to inhibit the reframing cycle once the comparing means indicates an in-frame condition has been obtained.

4,010,326
LINE SELECTIVE TIME DIVISION COMMUNICATION SYSTEM

Norman L. Schwartz, Stony Brook, N.Y., assignor to Multiplex Communications, Inc., Hauppage, N.Y.

Continuation-in-part of Ser. No. 414,434, Nov. 9, 1973, Pat. No. 3,916,108, and a continuation-in-part of Ser. No. 555,562, March 5, 1975. This application May 29, 1975, Ser. No. 581,972
Int. Cl.² H04J *5/00*
U.S. Cl. 179—15 BA **5 Claims**

1. A time-division multiplex communication system comprising:

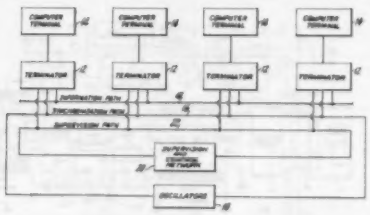
an information path consisting of a plurality of discrete lines each carrying samples of signals transmitted within selected time slots recurring once per frame;

oscillator means for generating a recurring series of synchronization signals that identify occurring time slots by unique combinations of phase relationships;

a synchronization path for carrying synchronization signals generated by the oscillator means;

a supervision path for carrying supervisory signals which indicate interconnections to be made within the system; and

a plurality of terminator means for providing data inputs to the information path and receiving data outputs from the information path, each terminator means including a supervisory comparator means for producing an output in response to a unique combination of phase relationship occurring in the synchronization path, latch means for accepting a signal from the supervisory path in response to an output received from the supervisory comparator

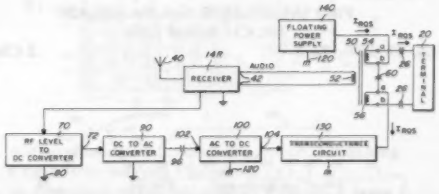


means and for producing first and second latch outputs in response thereto, multiplexer comparator means for receiving the first latch output whereby said comparator is temporarily set to be responsive to a unique combination of phase relationships in the synchronization path, said multiplexer comparator also being connected to the synchronization path for producing an output in response to the occurrance of said unique combination, demultiplexer means for activating one or more selected information path lines in response to the second latch output and for summing successive input samples sequentially received from the activated line or lines, and multiplexer means also responsive to the second latch output for activating one or more selected information path lines in response thereto and for sequentially supplying successive output samples to the activated line or lines.

4,010,327
COMMUNICATION SYSTEM INTERFACE CIRCUIT

Anthony Kobrinetz, Chicago, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed May 11, 1976, Ser. No. 685,223
Int. Cl.² H04Q *7/04*
U.S. Cl. 179—41 A **15 Claims**



1. In a communication system having first and second stations, the first station generating a DC signal voltage referenced to a ground potential, the two stations being intercoupled by a balanced line which is isolated from the ground potential, the improvement comprising:

DC-to-AC converter means for converting said DC signal voltage to a corresponding AC signal voltage;

AC-to-DC converter means for converting AC signals, at its input, to corresponding DC signals, at its output;

AC coupling means for AC coupling, but DC blocking, the AC signal voltage, from the DC-to-AC converter, to the input of the AC-to-DC converter; and

line coupling means for coupling the output of the AC-to-DC converter to the balanced line for transmission to the second station thereon.

4,010,328

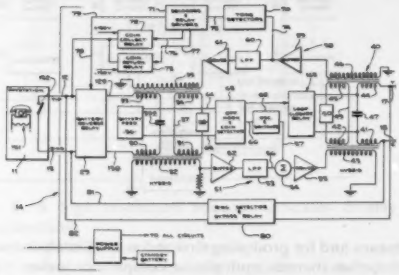
OUT-OF-BAND SIGNALING METHOD AND APPARATUS TO ADAPT PAYPHONES TO TELEPHONE SYSTEMS

Ronald F. McGuire, Fairfax, Va., assignor to The Anaconda Company, New York, N.Y.

Filed June 13, 1975, Ser. No. 586,733

Int. Cl.² H04M *1/00, 17/02*

U.S. Cl. 179—81 R **17 Claims**



1. Applique circuitry for adapting a telephone system to operate with a paystation, comprising

a. a first hybrid transformer connectible with said paystation,

b. a second hybrid transformer connectible with the telephone system,

c. a voice frequency transmit branch connected between certain coils of said first and second transformers, and including a first low pass filter to limit transmit voice frequencies to a selected band with an upper cut-off frequency f_1,

d. a voice frequency receive branch connected between other coils of said first and second transformers and including a second low pass filter, and

e. signaling circuitry connected between said first transformer and said voice frequency transmit branch at a location between said first filter and said second hybrid transformer to transmit signal tones above f_1.

4,010,329

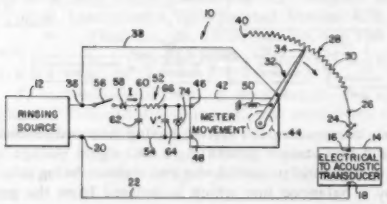
CRESCENDO CONTROL OF SIGNALLING DEVICES

Frederick Gaylord Draper, 1263 Redwood Court, Herndon, Va. 22070

Filed Oct. 29, 1975, Ser. No. 626,838

Int. Cl.² H04M *1/00*

U.S. Cl. 179—84 T **2 Claims**



1. A crescendoing signalling device responsive to a source producing a train of signal pulsations said device comprising: an electrical to acoustical transducer; a potentiometer including a resistor means and a wiper for movement along said resistor means, said potentiometer having a wiper terminal and a terminal connected to said resistor means; said potentiometer being connected in series with said transducer via said terminals; an electric motor means having a rotor coupled to said wiper for moving said wiper along said resistor means; passive circuit means responsive to said source and driving said motor means in a manner for rotating said rotor as said pulsations continue.

4,010,330

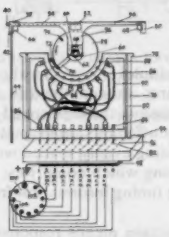
AUTOMATIC TELEPHONE DIALER

Cheng Shio, 145-34 34th Ave., Flushing, N.Y. 11354

Filed Aug. 11, 1975, Ser. No. 603,748

Int. Cl.² H04M *1/45*

U.S. Cl. 179—90 B **8 Claims**



1. An automatic telephone dialing apparatus for use with a conventional telephone to be mounted thereon, said apparatus comprising a control box for generating a series of electrical signals for accomplishing said automatic dialing, automatic dialing means mounted on said telephone, cable means connected between said automatic dialing means and said control box, said control box comprising a plurality of storage means, a plurality of programmable modules storing respective telephone numbers to be dialed, said storage means accommodating said modules, each of said modules being manually adjusted to set the telephone number to be automatically dialed, said control box further comprising a dialing wheel and a contact mounted and carried thereon in a circular path, each of said storage means comprising a circular support, said circular support being concentric with said dialing wheel, a plurality of contacts attached to said circular support, each of said modules comprising means to connect each of said plurality of contacts mounted on said circular support to a respective selected dial command signal for generating a series of electrical signals, said plurality of contacts being adapted to be touched by said contact on said dialing wheel, such that said series of electrical signals are generated to accomplish said automatic dialing.

4,010,331

TELEPHONE INTERCOMMUNICATION SYSTEM INCORPORATING IMPROVED DIALING ARRANGEMENT

Michael Geoffrey Cleeve Taylor, Teston; Bloomfield James Warman, Wandsworth, and Francis Charles Hackett-Jones, near Rochester, all of England, assignors to GTE International Incorporated, Stamford, Conn.

Filed Mar. 28, 1975, Ser. No. 563,044

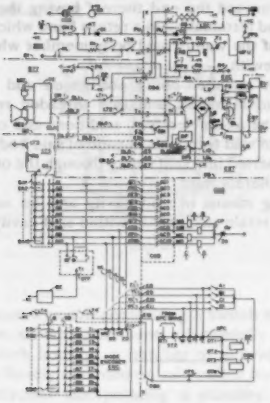
Claims priority, application United Kingdom, Apr. 3, 1974, 14879/74

Int. Cl.² H04M *1/72*

U.S. Cl. 179—99 **4 Claims**

1. A telephone system comprising, a plurality of extension telephone stations each including line switching means providing individual access to one or more common exchange lines; manually operable means individual to each telephone station

for keying digits to set a call and encoding means connected to said digit keying means operable in response to said keying means to generate coded input signals; pulse generating means exclusive to each common exchange line, comprising an integrated circuit arranged to draw operational power from said associated common exchange line, pulse repeating means connected between said integrated circuit and said exchange line and input signal repeating means connected between said



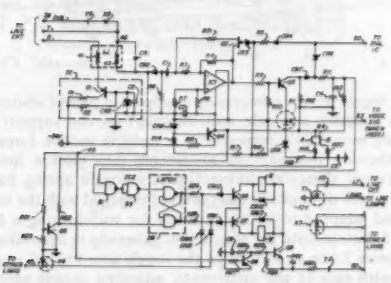
encoding means and said integrated circuit adapted to generate and apply to said line, dial pulses in response to receipt of corresponding input signals; and means adapted to respond to connection of each telephone station to an exchange line and to place the said manually operable keying means of said station in operative relation with the integrated circuit exclusive to said exchange line, whereby when said keying means is actuated to key a digit a corresponding input signal is applied to said integrated circuit.

4,010,332

LINK CIRCUIT FOR INTERCOM UNIT

Coy Edwin Matheny, Fulton, Ky., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Aug. 11, 1975, Ser. No. 603,397
Int. Cl.² H04M *1/72, 9/04*
U.S. Cl. 179—99 **6 Claims**



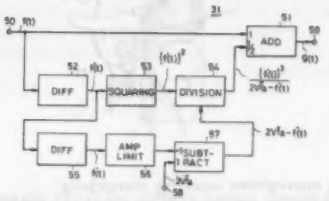
1. An intercom circuit including a plurality of link circuits for controlling supervisory signalling between respective calling and called station pairs, each link circuit including a first relay, the first relay in one link circuit responsive to a calling station signalling a called station to attempt the completion of an intercom call over said one link circuit between said stations, means in said one link circuit responsive to operation of said first relay in said one link circuit for disabling the first relays in each of the remaining link circuits from operating during the pendency of operation of said first relay, and means in said one link circuit operated on completion of said intercom call for causing restoration of said first relay of said one link circuit.

4,010,333

RECORD DISC RECORDING SYSTEM WITH A DISTORTION SIGNAL

Teruo Muraoka, Sagamihara; Kazunori Nisikawa, Fujisawa, and Kohji Seki, Ichikawa, all of Japan, assignors to Victor Company of Japan, Limited, Yokohama, Japan

Filed July 28, 1975, Ser. No. 599,581
Claims priority, application Japan, June 28, 1974, 49-86233
Int. Cl.² G11B *3/00*
U.S. Cl. 179—100.4 C **6 Claims**



1. A record disc recording system comprising:

a cutter head for recording a signal in a sound grove on a disc;

means for producing a signal which varies in accordance with the position of the cutter head as it travels over the disc, said signal being substantially represented by $2V^2 a$, where V is the relative linear velocity between the cutter head and the disc, and a is a specific coefficient;

means responsive to an original signal $f(t)$ and the signal $2V^2 \cdot a$ for forming a distortion signal represented by $\{f'(t)\}^2/\{2V^2 \cdot a - f''(t)\}$, which constantly conforms to the condition $|2V^2 \cdot a| > |f''(t)|$; and

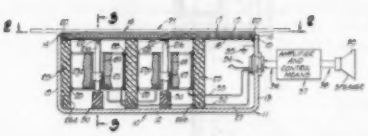
means responsive to the original signal $f(t)$ and the distortion signal $\{f'(t)\}^2/\{2V^2 \cdot a - f''(t)\}$ for producing a recording signal with a distortion represented by $g(t) = f(t) + \{f'(t)\}^2/2\{2V^2 \cdot a - f''(t)\}$ which is applied to the cutter head.

4,010,334

MOVING MAGNET CONTACT ACOUSTIC TRANSDUCER

James K. Demeter, 8542 Penfield, Canoga Park, Calif. 91306

Filed Jan. 27, 1975, Ser. No. 544,407
Int. Cl.² H04R *1/46, 10/04*
U.S. Cl. 179—114 M **13 Claims**



1. A dynamic acoustic transducer device, comprising:

a. a rigid body defining a support;

b. an elongated permanent magnet element;

c. an electric coil element surrounding said magnet and having terminals for connection to a signal circuit, said magnet having pole ends axially projecting beyond the ends of said coil;

d. a flat rigid diaphragm having its periphery elastically connected to said support;

e. said permanent magnet element being wholly positioned

on one side of said diaphragm and being attached thereto for vibrational axial movements therewith; and

f. elastic means supporting said electric coil on said support and constituting means resiliently isolating said coil from vibrational movements of said diaphragm.

4,010,335

MICROPHONE APPARATUS

Hiroshi Yasuda, Yokohama, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Oct. 24, 1975, Ser. No. 625,504

Claims priority, application Japan, Oct. 31, 1974, 49-125873

Int. Cl.² H04R *1/02*; **H04M** *1/05*

U.S. Cl. 179—156 R **6 Claims**

1. A microphone assembly comprising:

a. a housing consisting of a capsule and a projection extending from said capsule;

b. a cavity formed in said capsule;

c. a plurality of apertures bored through said capsule;

d. a microphone unit supported in said capsule, and being positioned in said cavity so as to communicate with the outside of said housing through said apertures; and

e. said projection being arranged to be inserted into the auditory canal and having a bore therethrough which communicates with said cavity.

4,010,336

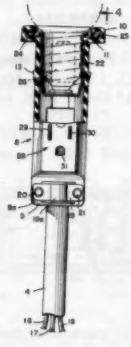
HAND LAMP

Tony Trevithick, Gurnee, Ill., assignor to Daniel Woodhead, Inc., Northbrook, Ill.

Filed July 10, 1974, Ser. No. 487,215

Int. Cl.² H01R *13/70*

U.S. Cl. 200—51 R **5 Claims**



1. A hand lamp comprising,

a. a one-piece, elongated body member formed of a molded, impact-resistant elastomer and having a cavity therethrough open at both ends.

b. a separate, unitary socket member received within said cavity, said socket member including

1. a threaded recess at one end thereof to receive a light bulb,

2. a two part cord clamp at the other end thereof adapted to receive and clamp thereon an electrical cord, one of the parts of said clamp being formed integral with said socket member,

3. terminals thereon, including a ground terminal to which electrical conductors in the cable may be connected, and

4. a ground strip connected at its inner end to said ground terminal and extending along the side of said socket member toward the end thereof having the threaded recess, and terminating in a return bend which receives the end of the wall of said body member when assembled therewith,

c. said socket member being pre-bussed and pre-wired between said terminals and said threaded recess, and adapted to be assembled with said cord and conductors connected to said terminals outside of said body member and then inserted into said cavity through the other of the open ends thereof, and

d. cooperating means in said cavity and on said socket member to retain said socket within said cavity.

4,010,337

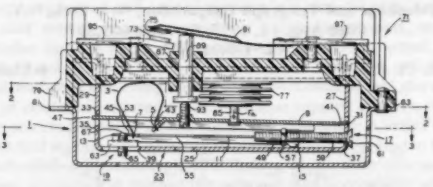
TOGGLE DEVICE

Paige W. Thompson, Morrison, and James P. Frank, Rock Falls, both of Ill., assignors to General Electric Company, Fort Wayne, Ind.

Continuation of Ser. No. 442,838, Feb. 15, 1974, abandoned. This application June 9, 1975, Ser. No. 585,149

Int. Cl.² H01H *13/36*

U.S. Cl. 200—67 D **16 Claims**

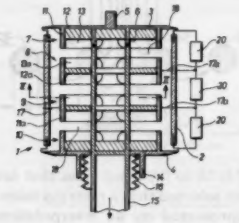


1. A toggle device comprising a support, a pair of abutments on the support, a toggle arm mounted on the support and pivotally movable in response to a variable motive force applied thereon between the abutments into motion limiting engagement therewith, respectively, a toggle spring having one of a pair of opposite ends thereof engaged with the toggle arm and adapted to be compressed for transmitting a force applied thereto onto the toggle arm generally in opposition to the motive force so as to urge the toggle arm toward engagement with one of the abutments, adjusting means pivotally mounted on the support and engaged with the other of the opposite ends of the toggle spring so as to compress the one opposite end thereof against the toggle arm for adjustably establishing the magnitude of applied force, and other adjusting means mounted on the support and engaged with the first named adjusting means for pivoting it and the toggle spring so as to adjust the other opposite end thereof with respect to the opposite end and angularly direct the applied force through the toggle spring onto the toggle arm.

4,010,338
VACUUM SWITCH HAVING AXIALLY DISPOSED SWITCHING ELEMENTS

Joachim Amsler, Seon, Switzerland, assignor to Sprecher & Schuh AG, Aarau, Switzerland

Filed May 29, 1975, Ser. No. 581,928
Claims priority, application Switzerland, June 13, 1974, 8114/74
Int. Cl.² H01H 9/42
U.S. Cl. 200—144 R **10 Claims**

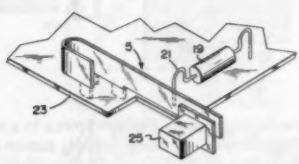


1. A vacuum switch comprising a switch housing having a central axis, switching elements substantially axially arranged in said switch housing, a number of individual sheet metal electrodes fixedly mounted on said switch housing, said sheet metal electrodes incorporating a plurality of substantially radially directed sheet metal members extending radially inwardly along said electrodes towards the central axis of the housing there being formed a set of gaps between the latter, respectively, said sheet metal electrodes including electrode end-surfaces confronting one another and serving to take up base points of an arc formable therebetween, said sheet metal electrodes being arranged in said switch housing in the form of a column with the electrode end surfaces situated opposite one another, respectively, there being formed a separation gap between said sheet metal electrodes, metallic chip layers being provided at the individual sheet metal electrodes, said switching elements including engageable contacts, at least one of said contacts being fixedly mounted, the other of said contacts being movable, said switching elements forming a separation gap extending within the height of the electrode column.

4,010,339
SPRING CONTACT SWITCH

Allan B. Owen, Montoursville, and Thomas M. Lynch, Williamsport, both of Pa., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Filed July 9, 1975, Ser. No. 594,327
Int. Cl.² H01H 3/12
U.S. Cl. 200—292 **1 Claim**



1. A spring contact switch for direct printed circuit board mounting comprising:

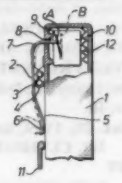
a flexible spring contact member affixed to a printed circuit board at one end and operatively available at the other end, said flexible spring contact member being substantially J-shaped with a U-shaped portion having two leg members with one of the leg members attached to an extended flat portion and having two mounting members extending outwardly therefrom and the other leg member having a third mounting member extending outwardly therefrom; and

electrical component means affixed to said circuit board and having a lead member formed for contact by said flexible spring contact member.

4,010,340
SWITCH MEMBER FOR PORTABLE, BATTERY-OPERATED APPARATUS

Tore Georg Palmaer, Smultronvagen 28, S-331 00 Varnamo, Sweden

Filed May 5, 1975, Ser. No. 574,700
Int. Cl.² H01H 3/20
U.S. Cl. 200—330 **4 Claims**

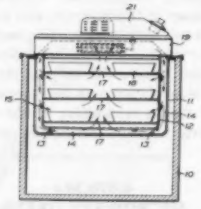


1. An automatic switch for portable battery operated radio receivers and the like comprising a housing in which said receiver or the like is located, an attachment member affixed to said housing for supporting said housing in use, a movable contact and a fixed contact located within said housing in a circuit between the receiver and the battery, said movable contact being spring biased in normally open position with respect to said fixed contact, said attachment member for supporting said housing being movable with respect to said housing into engagement with said movable contact to displace the same from its biased position into contact with said fixed contact.

4,010,341
HOT AIR OVEN

Nils Gosta Sigvard Ishammar, Malmo, Sweden, assignor to IFO Kampri AB, Sweden

Filed Nov. 12, 1973, Ser. No. 415,280
Claims priority, application Sweden, Nov. 13, 1972, 14692/72
Int. Cl.² H05B 1/00; F24C 7/00, 15/32
U.S. Cl. 219—400 **2 Claims**



1. An oven for treating of food comprising in combination a well of metal sheet material having a bottom and side walls and open at the top thereof, a removable insert of metal sheet material having vertical side wall means and a bottom and an open mouth at the top thereof in said well, said side wall means and said bottom of said insert being spaced from the side walls and the bottom of the well to define air circulating passages therebetween with the top of the circulating passages being open, said insert having gill openings formed in the portion of the vertical wall means of the insert defining the air passages and disposed substantially uniformly along and

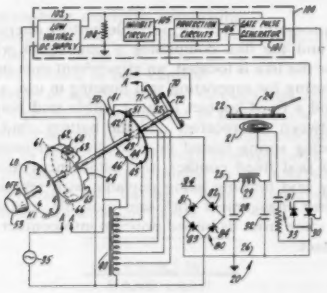
around the vertical limiting surfaces of said insert at different levels thereof and having the mouth thereof facing upwards on the outer side of the insert to divert air from said passages into the interior of the insert, said insert further having means for defining opening means at the bottom thereof for communicating the air passages with the interior of said insert, a lid removably fitted over the well to form a top closure thereof, an air circulating fan mounted on the lower side of the lid for drawing air upwardly out of the insert through the open mouth thereof, said fan propelling the air laterally to the open top of the air passages for circulation downwardly through the air passages for entry into the interior of the insert for circulation over the object to be heated, an electrical heater mounted on the lower side of the lid for heating air circulated by said fan, and said insert being provided with air previous support means for supporting the object to be heated.

4,010,342

INDUCTION COOKING APPLIANCE HAVING IMPROVED PROTECTION CIRCUITS

Buddy Julian Austin, Lafayette, Ind., assignor to Roper Corporation, Kankakee, Ill.

Filed Oct. 29, 1974, Ser. No. 518,772
Int. Cl.² H05B 5/04
U.S. Cl. 219—10.49 **25 Claims**



1. An induction cooking appliance for use with metallic utensils comprising in combination, a solid state inverter circuit including a gate controlled thyristor for producing ultrasonic frequency current pulses in a work coil to generate an ultrasonic frequency magnetic field, a substantially non-metallic cooktop for supporting the metallic utensil over the work coil, said utensil serving as an inverter load, a d.c. power supply for energizing the inverter, means for selecting the operating power level of the inverter, and a protection circuit, said protection circuit including sensing means coupled to the inverter circuit for sensing a condition indicative of the nature of the inverter load, means for varying the sensitivity of the sensing means in accordance with the operating power level of the inverter, and means responsive to the sensing means for disabling the inverter in the absence of a proper inverter load.

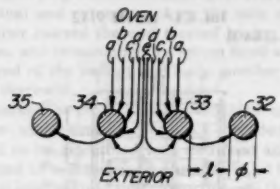
4,010,343

MICROWAVE OVENS

Junzo Tanaka, Fujiidera; Tsuyoshi Takami, Nara, and Toshio Kai, Yamatokoriyama, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Dec. 4, 1975, Ser. No. 637,703
Claims priority, application Japan, Dec. 9, 1974, 49-141802; Apr. 23, 1975, 50-56020
Int. Cl.² H05B 9/06
U.S. Cl. 219—10.55 D **5 Claims**

1. A microwave oven comprising a body having a heating chamber formed therein, a door mounted on said body and adapted to close and open a front opening of said heating chamber, a microwave generator for emitting microwave energy into said heating chamber and a door screen provided in said door, characterized in that said door screen comprises an electromagnetic wave shielding means composed of a metal mesh interposed between transparent plates, wherein said metal mesh is made of wires having a diameter ϕ in the range of 0.1 to 0.4 mm with a space l between the wires being



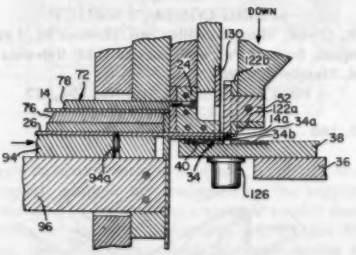
in the range of 0.18 to 0.92 mm, and that said diameter and said space are so selected that a ratio l/ϕ takes a value smaller than values represented by an interpolation curve passing through points corresponding to the values of ratio l/ϕ equal to 2.2, 3.3 and 4.3 for the values of said diameter ϕ equal to 0.4, 0.2 and 0.1 mm, respectively.

4,010,344

APPARATUS FOR TRANSFERRING A WORKPIECE OVER A ROUGH SURFACE

Edward D. Riordan, Hillsborough, and John R. Menges, Bricktown, both of N.J., assignors to Joyal Products, Incorporated, Linden, N.J.

Filed Mar. 28, 1975, Ser. No. 563,145
Int. Cl.² B23K 9/12
U.S. Cl. 219—80 **19 Claims**

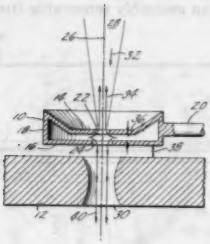


1. Apparatus for joining a first workpiece to a second workpiece, said apparatus comprising a supply station for receiving the first workpiece, a work station for receiving the second workpiece, and positioning means for accurately positioning the first workpiece in engagement with the second workpiece at a predetermined location spaced from the periphery of the second workpiece, said positioning means including a transfer guide and a transfer device for transferring the first workpiece along said transfer guide to the work station in a manner such that said transfer guide is between the first workpiece and the second workpiece during the transfer along said transfer guide until the first workpiece is moved to said predetermined location in engagement with the second workpiece.

4,010,345
GAS DELIVERY MEANS FOR CUTTING WITH LASER RADIATION

Conrad M. Banas, Bolton, and Aristotle Parasco, South Glastonbury, both of Manchester, Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed May 2, 1975, Ser. No. 574,132
Int. Cl.² B23K *27/00*
U.S. Cl. 219—121 L **4 Claims**



1. Gas handling means for use in cutting materials with laser radiation and comprising:

a hollow structure capable of withstanding an internal gas pressure, and directing gas at a workpiece along a flow axis as a moving stream of cutting assist medium, the structure capable also of allowing a beam of focused laser radiation propagated along a laser axis to pass therethrough without interference, the hollow structure having an upper plate and a lower plate and including;

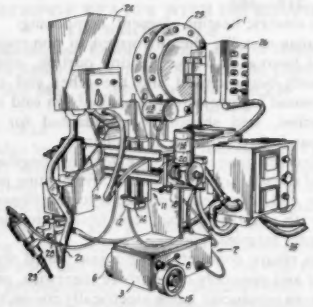
inlet means for receiving the gas from a source and admitting the gas under pressure to the interior of the structure, and

gas outlet means for releasing the pressurized gas through the upper and lower plates along the flow axis and delivering a stream of the gas to the location on the workpiece at which the radiation is focused, the outlet means having a first gas port positioned in the upper plate and a second gas port positioned in the lower plate.

4,010,346
SELF-PROPELLED TRACTOR FOR WELDING AND CUTTING APPARATUS AND THE LIKE

Shelby Cecil, Medina, and Donald Geringer, Parma, both of Ohio, assignors to Cecil Equipment Co., Inc., Medina, Ohio

Filed Apr. 14, 1975, Ser. No. 567,866
Int. Cl.² B23K *9/00*
U.S. Cl. 219—125 PL **24 Claims**



1. A self-propelled, free moving tractor or carriage adapted to carry a tool along a work path in a predetermined relative position therewith, said tractor comprising a base member, a plurality of wheel means supporting said base member for travel, drive means rotating at least one said wheel means for causing said tractor to travel, at least one said wheel means being mounted for rotation about an axis perpendicular to the axis of said driven wheel means for steering said tractor, motor means for rotating said steering wheel means about said perpendicular axis to steer said tractor, cross slide assembly means mounted on said tractor, said cross slide assembly means including a cross slide means mounted for movement in a direction transverse of said steering wheel axis, said cross slide means including reversible, motor driven screw means, and probe means carried on said screw means for movement therealong in response to rotation thereof, said probe means being adapted to follow a predetermined surface or abutment comprising a path, template, guide member or the like, and being responsive to changes or deviations in the direction of said surface or abutment transverse to said perpendicular axis to cause rotation of said screw means, said steering motor means being responsive to the responses of said probe to steer said tractor in a direction and to a distance substantially equal to each said change or deviation, respectively, in said surface or abutment.

4,010,347
COATED TUBULAR ELECTRODES

James Arlen Cole, El Monte, Calif., assignor to Cabot Corporation, Kokomo, Ind.

Filed Sept. 23, 1974, Ser. No. 508,521
The portion of the term of this patent subsequent to July 8, 1992, has been disclaimed.
Int. Cl.² B23K *35/22*
U.S. Cl. 219—146 **6 Claims**

1. A filled electrode comprising an elongated hollow metal tube, a particulate hard filler material filling the interior of said hollow metal tube, said metal tube being reduced in cross section and frictionally engaging said filler material at each end to prevent spilling, a dried slurry deposited coating covering a major portion of the exterior of one end of said tube and a minor portion of the other end of said tube, said major and minor coatings being spaced apart at said other end by an uncoated grip portion to be engaged by an electrode holder, said coatings filling the interstices of the filler material at both ends of said hollow tube.

4,010,348

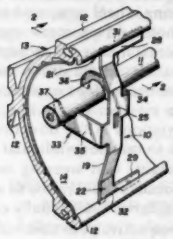
HEATER ROD SUPPORT BRACKET FOR RADIANT HEATER ASSEMBLY

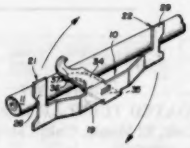
Fred G. Salinger, Baltimore, Md., assignor to Electro-Therm, Inc., Laurel, Md.

Filed Oct. 31, 1974, Ser. No. 519,462

Int. Cl.² H05B *302;* **F24H** *9/02;* **F16L** *3/08*

U.S. Cl. 219—347 **8 Claims**





1. In an electric radiant heater assembly of the type which includes a housing having an open front defined between at least two spaced apart housing edges at least one heater rod disposed within the housing and bracket means for supporting the rod in the housing, the improvement residing in said bracket means comprising at least one bracket having an elongate, generally flat, planar brace portion, clip means at each end of said brace portion for removably engaging the housing thereby removably to mount said bracket in the housing, at least one support arm which is integral with said brace portion, which is located intermediate the ends of said brace portion and which extends outwardly from said brace portion at an angle of approximately 90° thereto, said support arm having at least one arcuate surface which engages, and serves as a seat for, the rod, and said bracket being configured and arranged (a) for being inserted into the housing through the open front thereof in a first position where said brace portion is parallel to the heater rod and where said suppot arm projects inwardly but does not engage the rod, said insertion being without rod removal, and (b) for being rotated approximately 90° within the housing in a plane generally parallel to a plane containing the open front defining edges to a second position constituting said mounted position where said clip means engage the housing edges to secure said bracket in place and said arcuate rod seating surface of said support arm engages the rod.

4,010,349

PROOFING CABINET

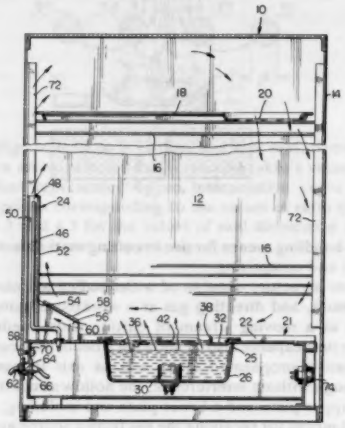
Robert E. Lee, Huntington, Ind., assignor to Lincoln Manufacturing Company, Inc., Fort Wayne, Ind.

Filed Feb. 27, 1975, Ser. No. 553,619

Int. Cl.² H05B *1/00;* **A21C** *13/00*

U.S. Cl. 219—401 **8 Claims**

1. A cabinet, especially for use in proofing dough prior to baking, and comprising; a cabinet structure having side, rear, top and bottom walls, a swingable front door and support means distributed along the side walls on the inside for supporting dough trays, first means near the bottom wall of the cabinet for generating water vapor to humidify the interior of the cabinet including a tray having electric heating means and adapted for receiving water, and second means near one wall of the cabinet for supplying heat to the interior of the cabinet to inhibit condensation of the generated water vapor therein including an electric heater in a vertical plane and at least one vertical panel adjacent to the last mentioned electric heater defining a vertical air flow channel in which said last mentioned electric heater is disposed, said first and second means being parts of an assembly removable from said cabinet as a



unit, said assembly comprising a frame having a horizontal portion slidable into the cabinet from the front above said bottom wall and a vertical portion upstanding from the rearward end of said horizontal portion, the tray being disposed in the horizontal portion and the at least one vertical panel comprising a part of said vertical portion with the lower end of the at least one vertical panel terminating above the said horizontal portion to define an air inlet opening to the air flow channel near the lower end of the vertical portion, the vertical portion including an air outlet for discharging heated air from the air flow channel in a direction upwardly along a wall of the cabinet.

4,010,350

ELECTRIC HEATING ELEMENTS

Donald M. Cunningham, Pittsburgh, Pa., assignor to Emerson Electric Co., St. Louis, Mo.

Filed June 16, 1976, Ser. No. 696,789

Int. Cl.² H05B *3/68*

U.S. Cl. 219—465 **6 Claims**

1. An electric heating element, comprising:

a tubular metallic sheath formed to non-rectilinear shape and having an active heating portion, one end of said sheath being closed and the other end constituting a terminal leg projecting laterally from said active heating portion, said sheath being adapted for mounting in grounded relation on an appliance,

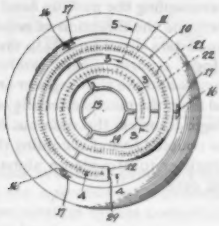
a coiled resistance member extending longitudinally within said sheath throughout said active heating portion, having one end terminating adjacent to the closed end of said sheath and the opposite end terminating adjacent to the sheath terminal leg,

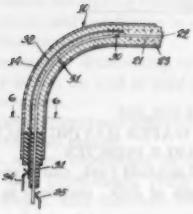
a bare return conductor within said coiled resistance member and generally coextensive therewith, one end of said return conductor being electrically connected to said one end of said resistance member,

the other end of said return conductor and said opposite end of said resistance member having terminals which

extend outwardly of said terminal leg and through an insulating bushing which closes the open end of said terminal leg, said terminals being adapted for connection to a source of electrical energy to energize said resistance member and thereby create heat,

compacted refractory material entirely filling said sheath between said return conductor, resistance member and said sheath and maintaining said sheath, said resistance member and said return conductor in electrically insulated relation while conducting heat from said resistance member to said sheath,





the geometry of a cross-section taken anywhere through said sheath in said active heating portion being such that, during energization of said resistance member to create heat, the insulation resistance between said resistance member and said return conductor is less than the insulation resistance between said resistance member and said sheath, whereby voltage breakdown caused by a hot spot in said active heating portion will occur between said resistance member and said return conductor to short therebetween until the voltage stress causes one of said resistance member and said return conductor to rupture and create an open electrical circuit.

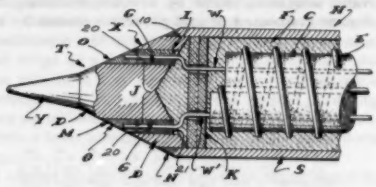
4,010,351

CARTRIDGE HEATER WITH IMPROVED THERMOCOUPLE

David E. Williams, and Edwin D. Hoyt, both of Hemet, Calif., assignors to Rama Corporation, San Jacinto, Calif.

Filed Mar. 18, 1976, Ser. No. 668,236
Int. Cl.² H05B *3/80*
U.S. Cl. 219—523 **7 Claims**

1. A cartridge heater with improved thermocouple comprising a tubular metal sheath with a front end, a metal plug closing the front end, a filler of dielectric material in the sheath rearward of the plug and an elongate resistance wire supported by the filler, said plug having a pair of spaced axially extending through holes, elongate insulating tubes with front and rear ends and engaged in said holes with their front ends spaced predetermined limited distances from the open front ends of the holes, a pair of elonate thermocouple wires with front end portions engaged through the tubes and projecting forwardly therefrom and rear portions supported in said filler and projecting rearwardly through and from the sheath and metal deposits in the forward portions of the holes in the plug in sealing engagement therewith and in heat con-



ducting contact with the thermocouple wires, said metal deposits being fused with the plug in said holes and with said thermocouple wires.

4,010,352

ZRO_2-BASE HEATING ELEMENTS

Bert Phillips, 1220 S. Garner St., State College, Pa. 16801

Filed May 21, 1975, Ser. No. 579,553
Int. Cl.² H05B *3/10*
U.S. Cl. 219—553 **4 Claims**

1. An electric resistance heating element for operating in oxidizing atmospheres to at least 1900° C, comprising a shaped element of stabilized ZrO_2 having a central heating section with long and larger terminal ends, said terminal ends being treated with liquid containing conduction-improving metal ions, incoming lead wires of high temperature metal alloy, being attached directly to, the terminal ends being surrounded with ZrO_2-base material containing conduction-improving oxides, and electrically insulating tubes attached directly to and covering most of the terminal ends and the ZrO_2-base material.

4,010,353

ELECTRONIC VOTING MACHINE WITH CATHODE RAY TUBE DISPLAY

Michael Terrance Moldovan, Jr., Lakewood; Charles Jerome Lindros, Jamestown; Robert Dean Wescott, Jamestown; Benedict Stewart Snyder,III, Jamestown; Richard John Cusimano, Jamestown, and Michael Kristan, Frewsburg, all of N.Y., assignors to AVM Corporation, Jamestown, N.Y.

Filed Sept. 11, 9174, Ser. No. 505,199
Int. Cl.² G07C *13/00*
U.S. Cl. 235—54 F **86 Claims**

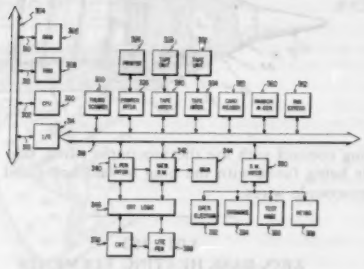
1. An electronic voting machine comprising, in combination:

processor means for processing selections made by a voter;

visual display means connected to said processor means for displaying a ballot to a voter; and

vote selection means connected to said processor means for allowing a voter to make selections from the displayed ballot;

said processor means including storage means for storing valid selections made by a voter, including recording means connected to said processor means for recording



the valid selections made by a voter, verification means under control of a voter for causing display of the valid selections on said visual display means, said verification means effecting transfer of the valid selections from said storage means to said recording means whereby the displayed verification is identical with recorded information.

4,010,354

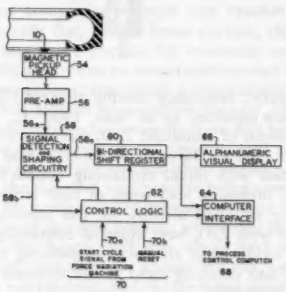
METHOD AND APPARATUS FOR TIRE IDENTIFICATION

Anthony M. Apicella, Jr., Massillon; Melvin H. Davis, Northfield Center, and Aurel V. Stan, North Canton, all of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Mar. 28, 1975, Ser. No. 563,266

Int. Cl.[2] G06K *7/08, 19/06;* **G11B** *5/00*

U.S. Cl. 235—61.6 R **8 Claims**



1. In a tire manufacturing process, apparatus for identifying tires at various locations within the process comprising in combination:

A. a magnetically encodable tape comprising a plurality of identifiably discrete tags for recording data thereon;

B. means to encode the tape tags with binary data indicative of tire identifying information comprising a magnetic write head, sensor means in proximate position to the write head adapted to being energized by a tag, means to transport the tape past the sensor means and the write head to position the tags for encoding binary data thereon, a write data register, means to enter binary data into the write data register, an amplifier interconnecting the write data register and the write head to provide signals to strobe the write head, a control logic circuit responsive to the energization of the sensor means by a tape tag and connected to the write data register to shift data out of the register one bit at a time to the amplifier and thus to the write head such that a tag is binary encoded with the tire identifying data;

C. means accepting the encoded tape to apply a tag from the tape to the sidewall surface of a tire at a specific radial distance as measured from the tire bead; and

D. means located at various process control locations for sensing and decoding the tag data on a tire to provide both a visual alpha-numeric display of the tire identification data and proper signal format to a computer for process and inventory control, said means comprising a magnetic pick-up head, means to effect relative motion between the tag on a tire sidewall and the pick-up head, a bi-directional shift register, signal detection and shaping means intercoupling the pick-up head and the shift register to determine the direction of relative motion to provide a shaped data signal serially to the bi-directional shift register, logic control means intercoupling the signal shaping means and the shift register and receiving a cycle start signal from the means effecting relative motion such that the logic transfers the data out of the shift register, and means coupled to and accepting the output data from the shift register to provide an alphanumeric visual display of the data.

4,010,355

SEMICONDUCTOR WAFER HAVING MACHINE READABLE INDICIES

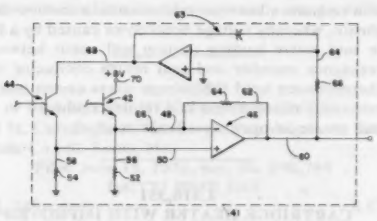
Kenneth Earl Roehrman, Litchfield Park, and Bernardus I. C. F. van Pul, Phoenix, both of Ariz., assignors to Motorola, Inc., Chicago, Ill.

Filed June 10, 1974, Ser. No. 477,892

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976

Int. Cl.[2] G06K *7/10;* **G08C** *9/06*

U.S. Cl. 235—61.11 E **14 Claims**



1. Means for identifying a semiconductor wafer having a top surface and a bottom surface comprising, in combination:

a. a flat edge on said semiconductor wafer,

b. a machine readable code and its complement positioned on the bottom of said semiconductor wafer in a predetermined relationship to said flat edge,

c. means for directing a first beam of radiant energy at the machine readable code,

d. means for directing a second beam of radiant energy at the complement of the machine readable code,

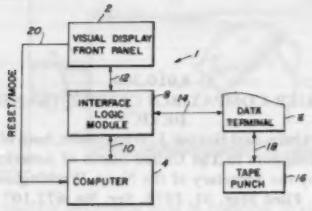
e. means for sensing said first and second beams after impinging on said semiconductor wafer, and

f. differential amplifier means for producing a series of output pulses representing said machine readable code, the outputs from said sensing means constituting the inputs to said differential amplifier.

4,010,356
TAPE PREPARATION SYSTEM

Harvey M. Evans, Escondido, and Patrick V. Keene, San Diego, both of Calif., assignors to Do All Company, Des Plaines, Ill.

Filed Oct. 15, 1974, Ser. No. 514,358
Int. Cl.² G06F 3/04
U.S. Cl. 235—151 **21 Claims**



1. A tape preparation system for preparing tapes of the type used in controlling the operation of numerically controlled devices, said tape preparation system comprising;

Illuminating visual display means;

said illuminating visual display means comprises;

storage means for storing messages descriptive of machine instructions and conditions in ordinary English

at least one display window;

display means for illuminating messages stored within said storage means on said at least one display window;

computer means;

input means for operator entry of information and data into said computer means;

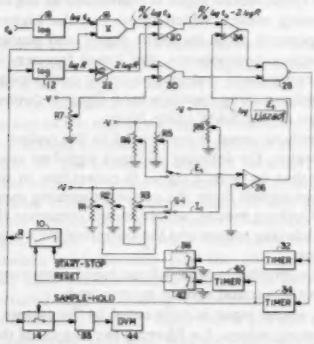
interface means connected to said computer means between said illuminating visual display means and said input means, said interface means for decoding signals generated by said computer means and controlling the operation of said illuminating visual display means and said input means;

recording means for recording certain of said signals generated by said computer means.

4,010,357
ANALOG VISIBILITY COMPUTER

Joseph L. Horner, Cambridge, Mass., assignor to The United States of America as represented by the Secretary of the Department of Transportation, Washington, D.C.

Filed Dec. 8, 1975, Ser. No. 638,599
Int. Cl.² G01V 1/28; G01N 21/00
U.S. Cl. 235—151.3 **14 Claims**



1. Apparatus for providing an indication of visual range comprising:

means for generating a voltage which varies with time from a predetermined level, said varying voltage generating means being resettable to said predetermined level;

first circuit means connected to said voltage generating means and responsive to an input field sensor measured signal commensurate with the instantaneous atmospheric transmittance and to said varying voltage for computing visual range as a function of a constant existing illuminance threshold and a constant luminous intensity of a preselected object, said first circuit means providing an output signal when the magnitude of said varying voltage reaches a level commensurate with the computed visual range;

second circuit means responsive to said input signal commensurate with the instantaneous atmospheric transmittance and to said varying voltage for computing visual range as a function of a constant contrast of the preselected object and a constant observed contrast, said second circuit means providing an output signal when the magnitude of said varying voltage reaches a level commensurate with the computed visual range;

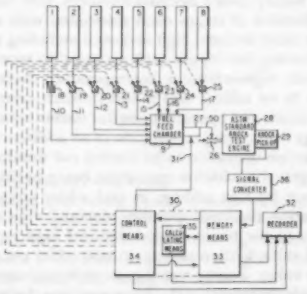
logic circuit means connected to said voltage generating means and to said first and second circuit means, said logic circuit means being responsive to the output signals provided by said first and second circuit means for terminating variation of the magnitude of the output voltage of said voltage generating means when both of said first and second circuit means provide output signals; and

means for sampling the output of said voltage generating means when the variation in magnitude thereof is terminated whereby said sampling means will measure a voltage commensurate with the greater of the visual ranges as computed by said first and second circuit means.

4,010,358
APPARATUS AND PROCESS FOR MEASURING FUEL OCTANE NUMBERS

William Emery Morris, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed June 19, 1975, Ser. No. 588,645
Int. Cl.² G01N 33/22
U.S. Cl. 235—151.35 **1 Claim**



1. In a process for determining fuel octane numbers from knock intensity signals generated by a test engine by comparing knock intensities of fuels of unknown octane numbers against knock intensities of fuels of known octane numbers, the improvement comprising, in sequence,

i. operating the test engine on each fuel at a series of feed-rate settings for a time sufficient to generate a knock intensity signal for each fuel at each of the feed-rate settings, said knock intensity signals bracketing the feed-rate setting which gives the maximum knock intensity for each fuel,

ii. calculating the approximate setting for each fuel at which the maximum knock intensity signal is generated,

iii. operating the engine on each fuel at a narrower series of feed-rate settings than employed in (i), such settings bracketing the approximate maximum knock intensity setting as determined in (ii), to produce a refined feed-rate setting at which the maximum knock intensity signal is generated for each fuel,

iv. storing the refined feed-rate setting of maximum knock intensity,

v. operating the test engine on each fuel at the stored refined feed-rate setting at which the maximum knock intensity is generated, for a time sufficient to generate a new knock intensity signal, the test engine being operated on the fuels of known and unknown octane numbers in alternating sequence, and

vi. calculating the octane numbers of the fuels of unknown octane numbers by comparing the new knock intensity signals produced in (v).

4,010,359
CIRCUIT ARRANGEMENT FOR ADDING AND SUBTRACTING

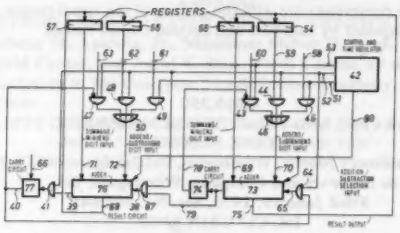
Gerald Weber, Braunschweig, and Jurgen Sorgenfrei, Braunschweig-Volkmarode, both of Germany, assignors to Olympia Werke AG, Wilhelmshaven, Germany

Filed Dec. 11, 1975, Ser. No. 639,891

Claims priority, application Germany, Dec. 21, 1974, 2460897

Int. Cl.² G06F 7/50

U.S. Cl. 235—169 **11 Claims**



1. A circuit arrangement for selectively adding or subtracting two binary coded decimal numbers, said circuit comprising: a plurality of stages each associated with a different respective order decimal digit and each including a binary adder circuit having two inputs each arranged to receive the binary bit signals representing a corresponding decimal digit of a number to be added, and a carry circuit connected to said adder circuit; and operation control means connected to each said stage for causing at least one of an addition operation and a subtraction operation to be carried out simultaneously in all said stages; the addition operation being performed, in each said stage, by first adding, in said adder circuit, the signals representing the corresponding decimal digit of one of the numbers to the binary coded decimal digit representing the decimal value 6, then adding, in said adder circuit, the resulting sum value, a carry signal present in said carry circuit, and the signals representing the corresponding decimal digit of the other number, and then adding, in said adder circuit, that result to a correction value constituted by the binary coded decimal digit representing the decimal value 10 whenever no carry is produced by the preceding addition, and the subtraction operation being carried out, in each said stage, by first adding, in said adder circuit, the binary bit signals representing a decimal digit of the number constituting the minuend, the unit complement of the binary bit signals representing the corresponding decimal digit of the other number, which constitutes the subtrahend, and the carry value present in said carry circuit, while storing any resulting carry in said carry circuit, and then adding, in said adder circuit, the result of the first addition and the correction value constituted by the binary coded decimal digit representing the decimal value 10, based on the signal in said carry circuit.

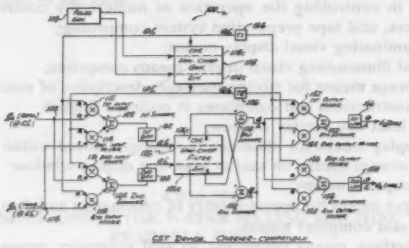
4,010,360
CARRIER-COMPATIBLE CHIRP-Z TRANSFORM DEVICE

James M. Alsup, and Harper J. Whitehouse, both of San Diego, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 31, 1976, Ser. No. 672,107

Int. Cl.² G06F 15/34; G06G 7/12

U.S. Cl. 235—193 **8 Claims**



1. A carrier-compatible device for computing the discrete Fourier transform of a complex input signal g_k having a real part and an imaginary part, using the chirp-Z transform (CZT) algorithm, comprising:

means for connecting to the real and imaginary parts of the input signal g_k;

a pulse generator, for generating a sequence of short rectangular pulses;

a chirp generator, whose input is connected to the output of the pulse generator, which generates cosine chirp signals and sine chirp signals;

means connected to the real and imaginary parts of the signal g_k and the cosine and sine chirp signals from the chirp generator, for mixing the four combinations of two input signals at a time;

means connected to the mixing means, for summing the outputs of the mixing means;

a chirp filter, whose input is connected to the output of the summing means, which filters out the higher frequency components from its input signal and passes the lower frequency components, the lower frequencies having a real component and an imaginary component;

a second summing means whose input is connected to the output of the SAW chirp filter;

means whose input is connected to the output of the chirp generator, for delaying its input signal an amount of time such that its output signal is coincident in time with the output signals from the second summing means;

second mixing means, whose inputs comprise the output of the delaying means and the output of the second summing means;

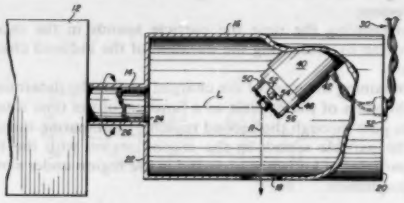
a third summing means, whose input comprises the output from the second mixing means; and

means whose input is connected to the output of the third summing means, for filtering the output of the third summing means, whose output comprises the real and imaginary parts of a complex number G_k at zero frequency.

4,010,361
LIGHT DEFLECTION APPARATUS

Robert C. Latterman, 1720 E. LaDonna, Tempe, Ariz. 85283, and Stuart G. Mirell, 407 W. Unversity Drive, Tempe, Ariz. 85281

Filed Mar. 3, 1975, Ser. No. 554,470
Int. Cl.² A63J 17/00
U.S. Cl. 240—10 R 3 Claims

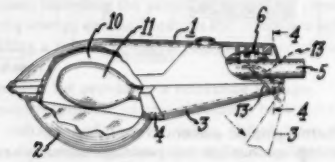


1. Apparatus for deflecting light in response to electromagnetic signals, comprising, in combination:
movable transducer means for converting electrical signals into magnetic pulses, including
a winding for transmitting electrical signals, and
a core disposed in the winding and linearly movable in response to the electrical signals in the coil;
support means secured to the core and movable therewith, including a plurality of posts secured to the core and a plurality of tension springs, including a tension spring secured to each post;
a mass secured to the plurality of the posts of the support means by the tension springs and movable in a nonlinear manner in response to the movement of the core and the support means; and
a mirror secured to the mass and movable therewith to deflect light.

4,010,362
LUMINAIRE SHIELD DEVICE

Thomas A. Fletcher, Dana, N.C., assignor to General Electric Company, New York, N.Y.

Filed Dec. 4, 1975, Ser. No. 637,757
Int. Cl.² F21V 17/00
U.S. Cl. 240—147 6 Claims

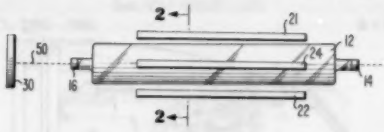


1. A luminaire comprising, in combination, a housing having an open end defining an axis and adapted to freely receive along said axis an elongated support member on which the luminaire is to be mounted, bearing means on said housing for engaging the top of the elongated support member, a movable clamp in said housing extending transverse said axis for engaging the bottom of the elongated support member, a pair of adjusting bolts on said housing respectively adjustably engaging said movable clamp on opposite sides of said axis, and a shield member comprising a generally U-shaped bendable sheet arranged in said housing for substantially covering the opening between said housing and the elongated support member, said sheet formed with a main sheild portion and a pair of apertured legs extending therefrom, said sheet arranged in said housing with its main shield portion extending below and transverse said axis and its legs respectively inserted on said pair of adjusting bolts above said movable clamp.

4,010,363
LASER ALIGNMENT SYSTEM

Karl Gerhard Hernqvist, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Oct. 31, 1975, Ser. No. 627,800
Int. Cl.² G01J 1/20
U.S. Cl. 250—201 9 Claims

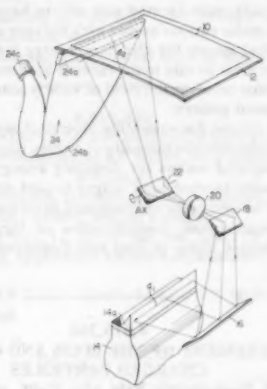


1. A system for maintaining the alignment of a gas laser comprising:
a gas discharge tube for producing a laser beam; and
a plurality of heaters extending longitudinally along the exterior of the tube spaced around the tube's longitudinal axis for selectively heating the tube.

4,010,364
OPTICAL SCANNING SYSTEM

Jyoichi Fuwa, Tokyo, Japan, assignor to Ricoh Co., Ltd., Tokyo, Japan

Filed May 29, 1975, Ser. No. 582,030
Claims priority, application Japan, June 1, 1974, 49-62291
Int. Cl.² H01J 3/14
U.S. Cl. 250—234 9 Claims

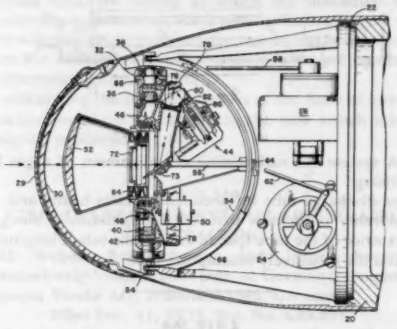


1. A scanning system comprising:
fixed light beam generating means to produce a light beam and move the light beam along a first linear path;
movable reflecting means to reflect the light beam onto a fixed surface to be scanned so that the light beam moves in a second linear path along the surface;
elongated light receiving means disposed parallel to the second linear path and closely adjacent to both the surface and the second linear path to receive the light beam reflected from the surface; and
drive means to move the reflecting means to displace the light beam in a direction perpendicular to the second linear path and to move the receiving means in synchronism with the movement of the reflecting means so that the receiving means moves in said direction perpendicular to the second linear path at the same speed as the displacement of the light beam in said direction so that the receiving means is maintained closely adjacent to both the surface and the second linear path to receive the light beam reflected from the surface.

4,010,365
SELF-STABILIZING IMAGE SCANNER

Franklin J. Meyers, Canoga Park, and Gino R. Sturiale, Woodland Hills, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed Mar. 26, 1973, Ser. No. 346,523
Int. Cl.² G01J 1/00
U.S. Cl. 250—236 **17 Claims**



1. A scanner adapted for being gimbal mounted, for providing electrical signals representative of the relative energy distribution within a field of view encompassing an optical axis, said scanner comprising:

a gyroscope adapted for being gimbal mounted, said gyroscope having a rotor;

a multi-faceted scan mirror disposed for rotation with said rotor, said multi-faceted scan mirror having mirror facets which make various angles with the spin axis of said rotor;

first optical means for directing energy received from said field of view to said multi-faceted scan mirror whereby as said rotor revolves the field of view is scanned in a two-dimensional pattern;

detector means for providing electrical signals representative of the relative intensity of energy applied thereto; and

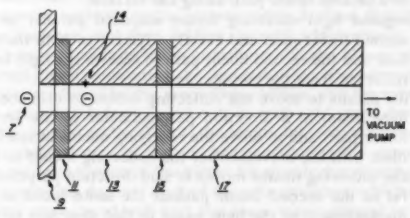
second optical means for directing energy reflected from said multi-faceted scan mirror to said detector means;

whereby as said rotor revolves said detector means provides electrical signals representative of the relative energy distribution along at least one dimension of said field of view.

4,010,366
MEASUREMENT OF THE MASS AND CHARGE OF CHARGED PARTICLES

Armand P. Neukermans, Palo Alto, Calif., and Dale R. Ims, Rochester, N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Sept. 22, 1975, Ser. No. 615,612
Int. Cl.² H01J 39/34
U.S. Cl. 250—282 **8 Claims**



1. A method of measuring the mass of a charged particle which comprises:

a. providing a tubular member having a first region which comprises a grounded conductive material and a second region which is in the form of a Faraday cage, said first and second regions being separated by an insulator;

b. introducing the charged particle into the first region of said tube while causing a stream of gas to flow through the tube in a direction away from the first region and toward the second region to and through the second region and induce a charge on the wall of the second region;

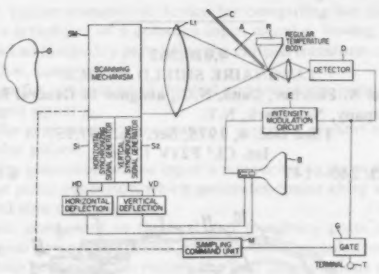
c. measuring the time the particle spends in the second region by measuring the duration of the induced charge; and

d. obtaining the mass of the charged particle by determining the mass of the particle as a function of the time it takes to pass through the second region by comparing the time the particle spends in the second region with the time particles of known mass spend in the region under similar conditions.

4,010,367
THERMOGRAPHIC CAMERA

Koji Suzuki, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 11, 1975, Ser. No. 639,699
Claims priority, application Japan, Dec. 18, 1974, 49-145199
Int. Cl.² H01J 31/49
U.S. Cl. 250—334 **2 Claims**



1. A thermographic camera comprising:

a scanning mechanism for two-dimensionally scanning an object on a frame by frame basis;

an infrared detector for detecting infrared light from said scanning mechanism, and

a two-dimensional scanning display device for displaying detection signals, as temperature information, from said infrared detector,

wherein there is made the improvement consisting of the provision, in said camera, of:

sampling command means for generating in every frame sampling instruction signals, whenever respective points of a previously selected plurality of points on the object, distributed in any desired way over the aspect of the object, are scanned by said scanning mechanism;

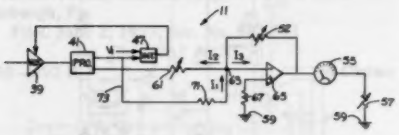
sampling means for sampling the detection signals from said infrared detector in response to said sampling instruction signals generated by said sampling command means; and

means for indicating information corresponding to successive samples for/of each of said points, segregated from other information contained in said detection signals.

4,010,368
TEST APPARATUS

Edmond R. Pelta, Pacific Palisades, Calif., assignor to Autoscan, Inc., Culver City, Calif.

Continuation of Ser. No. 463,364, April 23, 1974, abandoned.
This application Apr. 28, 1976, Ser. No. 680,920
Int. Cl.² G01J 1/00; G01N 21/24, 21/26, 21/28
U.S. Cl. 250—343 8 Claims



1. A combination for determining a percentage of concentration of a particular gas in a gas mixture, including:

a gas cell adapted to receive the gas mixture;

a source of infrared energy positioned with respect to the gas cell to introduce the infrared energy through the gas cell;

the particular gas in the cell having properties for reducing the magnitude of the infrared energy emanating from the cell in an amount dependent upon the percentage of concentration of a particular gas in a gas mixture;

amplifier means having a variable gain;

first means including the amplifier means for receiving the infrared energy emanating from the gas cell and for providing an electrical signal having particular characteristics dependent upon the percentage of concentration of the particular gas in a gas mixture;

second means responsive to the electrical signal and having a variable impedance for providing a modified electrical signal having the particular characteristics;

a reference cell positioned with respect to the source of infrared energy to receive the infrared energy and having a reference gas to provide a particular reduction in the infrared energy emanating from the cell;

third means including the amplifier means for receiving the infrared energy emanating from the reference cell and for providing a reference signal representative of such infrared energy;

fourth means for providing a reference voltage;

fifth means responsive to any difference between the reference voltage and the reference signal from the third means for adjusting the gain of the amplifier means to provide the reference signal with characteristics corresponding to the reference voltage;

sixth means for comparing particular characteristics of the reference signal and the modified electrical signal and for providing an output signal having at least one characteristic dependent upon the difference of the particular characteristics of the modified electrical signal and the reference signal;

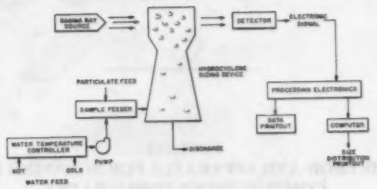
a meter responsive to the output signal for providing an indication of the percentage of concentration of the particular gas in the gas mixture; and

seventh means to control the variable impedance of the second means for varying the magnitude of the modified electrical signal to provide the output signal with a particular magnitude representative of the absence of the particular gas in the gas mixture for providing the meter with a zero indication and for calibrating the analyzer for the span of the meter.

4,010,369
METHOD FOR RAPID PARTICLE SIZE ANALYSIS BY HYDROSIZING AND NUCLEAR SENSING

Charles B. Daellenbach, and Warren M. Mahan, both of Burnsville, Minn., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Jan. 29, 1974, Ser. No. 438,152
Int. Cl.² G01F 1/00
U.S. Cl. 250—356 6 Claims



1. A system for determining the particle size and mass distribution of a sample of randomly sized particles from a known total mass comprising:

a series of interconnected liquid cyclones for separating the randomly sized particles into a series of discrete fractions according to their size, said particles being fed into said cyclones in a liquid slurry at a controlled velocity;

said interconnections comprising a series of conduits that are progressively smaller in cross-sectional area between any two liquid cyclones when measured perpendicular to the liquid flow;

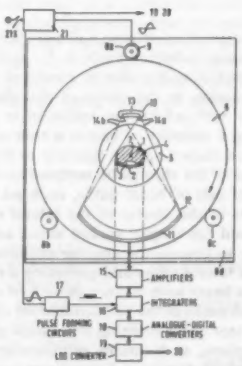
means for detecting the particle mass of each of said discrete size fractions; and

means for indicating the detected mass of said fractions.

4,010,370
COMPUTERIZED TOMOGRAPHY APPARATUS WITH MEANS TO PERIODICALLY DISPLACE RADIATION SOURCE

Christopher Archibald Gordon LeMay, Osterley, England, assignor to EMI Limited, Hayes, England

Filed Nov. 11, 1975, Ser. No. 630,779
Claims priority, application United Kingdom, Nov. 13, 1974, 49074/74
Int. Cl.² G01N 21/34, 23/04; G01T 1/20; H05G 1/00
U.S. Cl. 250—366 7 Claims



1. An apparatus for examining a substantially planar section of a body by means of penetrating radiation such as X- or γ-radiation including a source of a fan of radiation lying in the plane of the said section and originating substantially from a

point, a plurality of detectors for detecting the radiation after passage through the body along a plurality of beams at different angles within the fan, means for angularly displacing the source and detectors about a common axis perpendicular to the said plane and means for subjecting the said point of origin to a periodic displacement, relative to the detectors and in the said plane, such that during each of a series of increments of said angular displacement, said periodic displacement causes a further angular displacement of said beams, substantially equal and opposite to said first mentioned angular displacement to cause each of said beams to remain parallel to its position at the start of the respective increment.

4,010,371

METHOD AND APPARATUS FOR SCANNING IN COMPUTERIZED TOMOGRAPHY

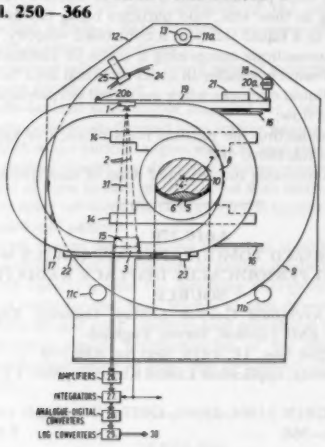
Christopher Archibald Gordon LeMay, Osterley, England, assignor to EMI Limited, Hayes, England

Filed Dec. 10, 1975, Ser. No. 639,478

Claims priority, application United Kingdom, Dec. 19, 1974, 55060/74

Int. Cl.² G01N *23/08*

U.S. Cl. 250—366 **4 Claims**



1. A method of examining a planar slice of a body by means of penetrating radiation such as X- radiation including the steps of irradiating the slice by means of a fan-shaped spread of the radiation in the plane of the slice, determining the absorption suffered by the radiation in passing though the body along a plurality of beams within said spread, scanning the said fan-shaped spread laterally in the said plane to provide values of the absorption suffered by the radiation along a plurality of sets of beam paths, each set provided by one of said beams in the course of the lateral scan, simultaneously rotating said fan-shaped spread about an axis normal to the said plane to change the angular positions of the said sets in successive lateral scans and providing a corrected absorption value for a beam path of a set, in view of absorption values for other beam paths of the set, suitable for allocation to locations of a data store, representing a notional matrix of elements in the said plane, at locations representing elements within a predetermined distance of that beam path, wherein the corrections for each set are derived as if the set were parallel (in the absence of said rotation) but the corrected values are allocated to element in the region of the actual path followed by the radiation taking into account the said rotation.

4,010,372

DEVICE FOR MEASURING THE ULTRA-VIOLET RADIATION IN THE UV-A AND/OR UV-B RANGE

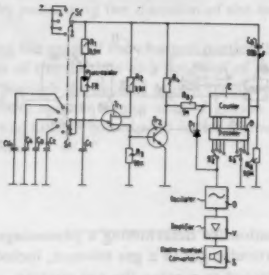
Karl Adler, Grenchen, and Ernst Strutz, Zurich, both of Switzerland, assignors to Biviator AG, Grenchen, Switzerland

Filed July 10, 1975, Ser. No. 594,647

Claims priority, application Switzerland, July 16, 1974, 9757/74

Int. Cl.² G01J *1/42*

U.S. Cl. 250—372 **4 Claims**



1. A device for measuring the ultra-violet radiation in the UV-A and UV-B ranges, comprising at least one optical filter for passing radiation in one of the ranges of 280–315 nm and 315–380 nm, a radiation detector receiving radiation from said filter and responsive to at least said one of said ranges, electronic means for receiving the signals from the detector and providing an output representative of radiation received from said filter, first switching means connected to said electronic means for programming the same to the skin sensitivity of the user, means coupled to said electronic means for displaying the dose of said radiation and second switching means connected to said electronic means for calibrating the same to the characteristics of different line intensities of at least two different radiation sources in the UV-A and UV-B ranges.

4,010,373

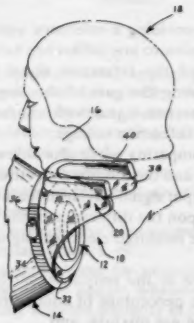
PATIENT RESTRAINING DEVICE FOR THE PINHOLE COLLIMATOR AND GAMMA SCINTILLATION CAMERA

Thomas D. Kay, 2814 Knight Robin, San Antonio, Tex. 78209

Filed Oct. 10, 1975, Ser. No. 621,328

Int. Cl.² G01N *21/00, 23/00;* G01T *1/20*

U.S. Cl. 250—456 **8 Claims**



5. A restraining device comprising a holder and an adapter, said adapter having a scaled mounting element, said scaled element having a plurality of reference marks thereon, said holder having a body portion, said body portion being adjustably mounted upon said scaled element and being slideable with respect to said reference marks on said scaled element,

said body portion of said holder having a base containing a split therein, a clamp encompassing said holder base for adjustably securing said holder to said scaled element and said holder having a configuration capable of fixedly positioning a specific area of a patient in operative alignment with the collimator of a Gamma Scintillation Camera.

4,010,374

ULTRAVIOLET LIGHT PROCESSOR AND METHOD OF EXPOSING SURFACES TO ULTRAVIOLET LIGHT

Warren J. Ramler, Elmhurst, Ill., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed June 2, 1975, Ser. No. 583,311
Int. Cl.² H01J *37/20*
U.S. Cl. 250—492 R **30 Claims**

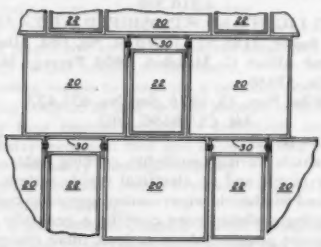
1. In the method wherein the surface of a workpiece is exposed to ultraviolet light from at least one primary optical system comprising a first source of ultraviolet light and a reflector for reflecting ultraviolet light from said first source to said surface such that the ultraviolet flux from said primary optical system incident per unit area of said surface is greater at the central region of said surface than at an edge thereof, the improvement comprising: exposing said surface to ultraviolet light from at least one secondary optical system comprising a second source of ultraviolet light and a reflector for reflecting ultraviolet light from said second source to said surface such that the ultraviolet flux from said secondary optical system incident per unit area of said surface is greater at said edge than at said central region thereof, to thereby cause said central region and said edge to be exposed to approximately equal total amounts of ultraviolet energy per unit area.

4,010,375

STORAGE RACK FOR NUCLEAR FUEL ASSEMBLIES

William J. Wachter, R.D. 4, English Road, Wexford, Pa. 15090, and Thomas R. Robbins, 1528 Crofton Parkway, Crofton, Md. 21114

Filed May 27, 1975, Ser. No. 580,949
Int. Cl.² G21F *5/00*
U.S. Cl. 250—507 **13 Claims**



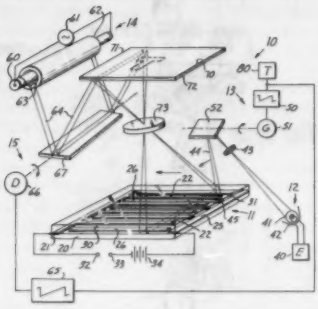
1. A storage rack for nuclear fuel assemblies comprising a plurality of storage cells each arranged to contain at least one fuel assembly, and a plurality of poison boxes, each of said poison boxes comprising an enclosure containing a moderator and having walls incorporating a neutron-absorbing material, said storage cells and poison boxes being disposed in an array such that each cell is immediately adjacent at least one poison box.

4,010,376

PHOTOCONDUCTIVE COMMUTATORS

Sherman W. Duck, Sunnyvale, Calif., assignor to Bell & Howell Company, Chicago, Ill.

Filed Apr. 4, 1975, Ser. No. 565,313
Int. Cl.² H01J *39/12*; **250** *211 R;578;559;567;235;233;236*
U.S. Cl. 250—578 **26 Claims**



1. In a method of selectively addressing points in a coordinate system, the improvement comprising in combination:

providing a coordinate system of a plurality of first electrodes and a plurality of second electrodes by arranging said first and second electrodes in mutually parallel planes;

providing a further first electrode adjacent said first electrodes;

providing a further second electrode adjacent said second electrodes;

providing photoconductor material between said further first electrode and said plurality of first electrodes;

providing photoconductor material between said further second electrode and said plurality of second electrodes;

connecting said further first electrode and said further second electrode to electrical equipment with respect to which said points are to be addressed;

scanning a first beam of radiant energy along an edge of said further first electrode in a continuous scanning path and selectively rendering photoconductor material between said further first electrode and said plurality of first electrodes photoconductive with said first beam of radiant energy to selectively connect said further first electrode to said plurality of first electrodes; and

scanning a second beam of radiant energy along an edge of said further second electrode in a continuous scanning path and selectively rendering photoconductor material between said further second electrode and said plurality of second electrodes photoconductive with said second beam of radiant energy to selectively connect said further second electrode to said plurality of second electrodes.

4,010,377

COMBINED GENERATOR AND BOAT PROPULSION SYSTEM

James W. McKenzie, P.O. Box 504, Rogers, Ark. 72756

Filed Feb. 20, 1975, Ser. No. 551,312
Int. Cl.² H02P *9/04*
U.S. Cl. 290—1 R **10 Claims**

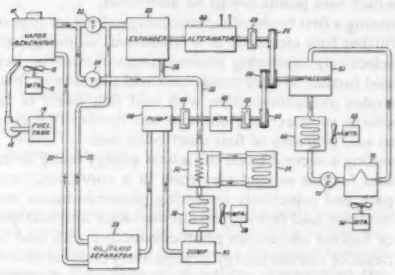
1. A power system comprising a power driven generator, a propulsion unit incorporating a driven shaft, an adaptor mounting said generator on said propulsion unit, said generator including a drive shaft, and clutch means selectively cou-

pling said generator drive shaft and said propulsion unit driven shaft upon attainment, by said generator drive shaft, of a predetermined rotational speed for a direct driving of the propulsion unit by the generator.

4,010,378
INTEGRATED ELECTRIC GENERATING AND SPACE CONDITIONING SYSTEM

Bobby J. Tharpe, Phoenixville, and James C. Graf, Fort Washington, both of Pa., assignors to General Electric Company, Fairfield, Conn.

Filed Dec. 20, 1974, Ser. No. 534,711
Int. Cl.² F01K *15/00*
U.S. Cl. 290—2 **4 Claims**

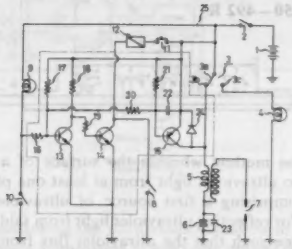


1. An integrated electric generating and space conditioning system comprising:
- generating means for generating electrical power;
- vapor generator means for vaporizing a motive fluid;
- rotary prime mover means for driving said generator means;
- means for supplying at a controlled rate said vaporized motive fluid to said rotary prime mover means;
- heat exchange means for heating fluid with vapor;
- means for conveying vapor directly to said heat exchange means from said vapor generator;
- means for conveying vapor exhausted from said rotary prime mover means to said heat exchange means;
- condenser means for receiving vapor from said heat exchange means and condensing it;
- pump means for delivering condensed vapor from said condenser means to said vapor generator means;
- a motor for driving said pump; and
- heating means for producing sensible heat for space heating from said heated fluid.

4,010,379
SAFETY DEVICE FOR A MOTORCYCLE

Takeshi Shimamoto, Akashi, Japan, assignor to Kawasaki Jukogyo Kabushiki Kaisha, Japan

Filed Dec. 15, 1975, Ser. No. 640,762
Claims priority, application Japan, Dec. 20, 1974, 49-155331
Int. Cl.² B60L *1/00*
U.S. Cl. 307—9 **5 Claims**



1. A safety device for a motorcycle having a stand movable between operative and inoperative positions, said safety device comprising, in combination, an ignition circuit composed of a primary winding of an ignition coil and a circuit breaker; a battery; a main switch connected to said battery and operable to connect said ignition circuit in parallel with said battery; a motorcycle stand switch connected in series with said ignition circuit and said main switch and operable to break said ignition circuit when the motorcycle stand is in an operative position and to complete the ignition circuit when the motorcycle stand is in inoperative position; a first electronic switching element connected in parallel with said motorcycle stand switch; a neutral switch connected in parallel with said battery through said main switch and operable to an operative position only when a transmission is in the neutral position; and circuit means connecting said neutral switch to said first electronic switching element and operable, responsive to said neutral switch being operated to its operative position, to bring said first electronic switching element to an on state.

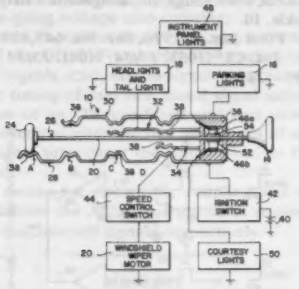
4,010,380
COMBINED LIGHT AND WINDSHIELD WIPER SWITCH

Edmund F. Bailer, 2185 NE. 123rd St. No. 104, Miami, Fla. 33181, and Albert G. Makdad, 6604 Tarrega St., Coral Gables, Fla. 33146

Filed Nov. 13, 1975, Ser. No. 631,423
Int. Cl.² B60G *1/02*
U.S. Cl. 307—10 LS **2 Claims**

1. In a vehicle having headlights, parking lights, a windshield wiper motor and an electrical supply system, a combined light and windshield wiper control apparatus comprising a switch having a sliding core carrying a generally circular contact element positionable in at least three discrete positions, means for coupling said contact element to said electrical system in each of said three positions, three elongated conductive strips spaced angularly about said core, said strips carrying contact means for engaging said contact element, a first of strips being coupled to said parking lights, the contact means of said first strip being located for engaging said contact element in each of said three position, a second of said strips being coupled to said headlights, the contact means of said second strip being located for engaging said contact element in two of said three positions, a third of said strips

being coupled to said windshield wiper motor, the contact means of said third strip being located for engaging said



contact element in one of the two contact means positions associated with said second strip.

4,010,381

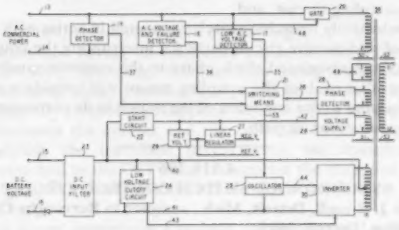
NO-BREAK AC POWER SUPPLY

Hermann Fickenscher, Morristown, and Rudolph Scuderi, Mountain Lakes, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Apr. 24, 1975, Ser. No. 571,092

Int. Cl.² H02J 9/00

U.S. Cl. 307—66 **24 Claims**



1. An uninterruptible power supply comprising a power transformer including a first primary winding, a second primary winding, and a secondary winding,

signal sensing means coupled to said first primary winding and responsive to detect a signal amplitude below a desired normal amplitude threshold,

generating means to generate a periodic power signal and being coupled to said second primary winding,

power flow control means to selectively control power transfer from said first and second primary windings to said secondary winding including

first phase detection means to monitor a signal phase of said secondary winding,

phase control means coupled to said first phase detection means and to said generating means and normally operative to align the phase of said periodic signal with said signal phase of said secondary winding,

second phase detection means to monitor a signal phase of said first primary winding,

said phase control means coupled to said second phase detection means and to said signal sensing means and operative in response to a signal amplitude below a desired normal amplitude detected by said signal sensing means to align the phase of said periodic signal with a signal of said first primary winding.

4,010,382

PUSH-BUTTON TYPE PULSE GENERATING SWITCH

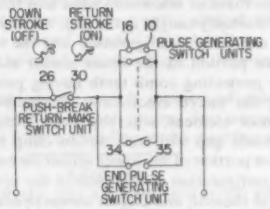
Matsuo Nishioka, and Shunzo Oka, both of Hirakata, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Dec. 26, 1974, Ser. No. 536,374

Claims priority, application Japan, Dec. 29, 1973, 48-2696; Dec. 29, 1973, 48-3379; Dec. 29, 1973, 48-3380; Dec. 29, 1973, 48-3381; Dec. 29, 1973, 48-3382; Dec. 29, 1973, 48-3383

Int. Cl.² H03K 3/00

U.S. Cl. 307—106 **24 Claims**



1. A push-button type pulse generating switch comprising

a. pulse generating switching means including an operating shaft for generating number pulses in the return stroke of said operating shaft,

b. end pulse generating switching means electrically connected in parallel to said pulse generating switching means for generating an end pulse in response to the end of said return stroke

c. push-break return-make switching means electrically connected in series to both said pulse generating switching means and said end pulse generating switching means for disabling said pulse generating switching means in response to the forward stroke of said operating shaft and for energizing said pulse generating switching means and said end pulse generating switching means in response to the return stroke of said operating shaft, and

d. the number pulses and the end pulse thereby being generated when said push-break return-make switching means is closed in said return stroke of said operating shaft.

4,010,383

PRECIPITATION DETECTOR FOR ARRANGEMENTS WHICH CONTROL WINDSHIELD WIPERS AND/OR WASHERS, AND THE LIKE

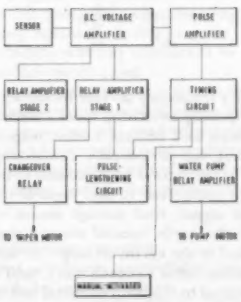
Günter Grassmann, 3151 Eddesse Nr. 40, Germany

Filed Aug. 15, 1975, Ser. No. 605,176

Claims priority, application Germany, Aug. 17, 1974, 2439590; Mar. 13, 1975, 2510885

Int. Cl.² H02G 3/00

U.S. Cl. 307—118 **19 Claims**



1. In an arrangement for controlling the operation of a

windshield wiper motor on a vehicle, in combination, at least one upper and one cooperating lower sensor element, each sensor element being comprised of a naked electrically conductive portion which adjoins the naked electrically conductive portion of the other sensor element of the pair of sensor elements to define an interelectrode gap, the naked electrically conductive portions being exposed to precipitation, the space between the electrically conductive portion of the upper sensor element and that of the lower sensor element being empty both between such conductive portions and also rearwardly of the interelectrode gap, so that precipitation bridging the interelectrode gap will not be supported from behind against the force of oncoming wind and thus not tend to become protractedly caught in the gap, the lower sensor element being of comb-like configuration and the naked electrically conductive portion of the lower sensor element comprising upwardly projecting comb teeth having pointed ends closely adjoining the naked electrically conductive portion of the upper sensor element, whereby water droplets bridging the interelectrode gap will tend not to cling to the electrically conductive portion of the lower sensor element because of the pointed configuration of the ends of the upwardly projecting comb teeth thereof; and circuit means operative for detecting the existence of precipitation by detecting the interelectrode gap resistance changes resulting from the bridging of the interelectrode gap by precipitation and in response to such detection generating a control signal for the windshield wiper motor.

4,010,384

BINARY FREQUENCY DIVIDER FOR MICROWAVES

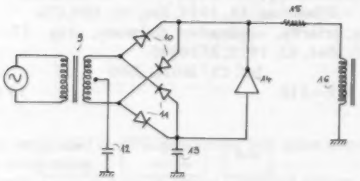
Roger Charbonnier, Meudon, France, assignor to Ardet Electrique, France

Filed Aug. 15, 1975, Ser. No. 605,091

Claims priority, application France, Oct. 29, 1974, 74.36047

Int. Cl.² H03K *21/00, 5/08*

U.S. Cl. 307—220 R **4 Claims**



1. A binary frequency divider including at least one trigger circuit comprising switching means having first, second and third terminals and control means responsive to a periodic control signal, for periodically connecting the first terminal alternately to the second terminal and to the third terminal, an input circuit connected to said control means and providing said control signal; first storage means connecting the first terminal to the earth; second storage means connecting the third terminal to the earth; an amplifier having a negative gain whose absolute value exceeds unity, said amplifier having an input connected to the third terminal and an output connected to the second terminal; and an output circuit connected to the output of the amplifier.

4,010,385

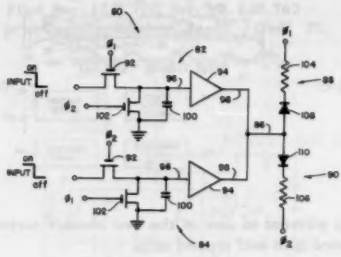
MULTIPLEXING CIRCUITRY FOR TIME SHARING A COMMON CONDUCTOR

William S. Krol, Park Ridge, Ill., assignor to Teletype Corporation, Skokie, Ill.

Filed Jan. 9, 1976, Ser. No. 647,689

Int. Cl.² H03K *17/54;* **H04L** *15/34*

U.S. Cl. 307—243 **4 Claims**



1. A multiplexing circuit for time sharing signals over a common conductor comprising:

a plurality of individual passive circuit paths each having a predetermined resistance characteristic with one end of each circuit path being connected to a common conductor;

a plurality of sampling circuits each corresponding to one of said passive circuit paths, each of said sampling circuits being connected to said common conductor;

means for applying a distinct phase of a multiphase clock signal to each of said passive circuit paths for coupling to said common conductor and for applying the same phase of said multiphase clock signal to the corresponding sampling circuit; and

a selectively operable switch connected in series with each of said passive circuit paths for interrupting the coupling of the associated clock phase to the common conductor so that each of the sampling means will provide a signal related to the condition of the switch in its corresponding passive circuit path.

4,010,386

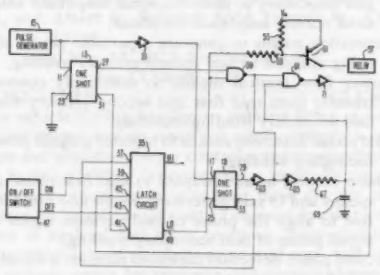
SYNCHRONOUS SWITCH CONTROL CIRCUIT

Allen J. Rossell, Detroit, Mich., assignor to Burroughs Corporation, Detroit, Mich.

Filed Jan. 20, 1976, Ser. No. 650,629

Int. Cl.² H03K *17/00*

U.S. Cl. 307—252 UA **17 Claims**



1. A switching control circuit for timing the selective energization of a load by an AC power source in response to the actuation of an ON/OFF switch comprising:

means for generating pulses having transitions synchronous with the voltage zero-crossings of the AC power source;

timing means triggered by said pulse generating means for generating a first timed signal which begins on the occurrence of a positive-going voltage zero-crossing and a second timed signal which begins on the occurrence of a negative-going voltage zero-crossing;

output means responsive to said timing means and the actuation of the ON/OFF switch for generating turn-on and turn-off signals, said turn-on signal being generated after the first timing of said first timed signal subsequent the actuation of an ON condition and said turn-off signal being generated after the first timing out of said second timed signal subsequent the actuation of an OFF condition; and

switching means for electrically coupling and uncoupling the load from the AC power source in response to said turn-on and turn-off signals, respectively.

4,010,387

POWER TRANSISTOR SWITCHING APPARATUS

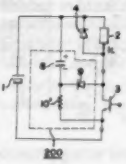
Masahiko Akamatsu, Amagasaki, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Toyko, Japan

Filed Apr. 14, 1975, Ser. No. 567,995

Claims priority, application Japan, May 11, 1974, 49-52517

Int. Cl.² H03K *17/64, 17/60*

U.S. Cl. 307—253 **3 Claims**



1. A power transistor switch comprising:

a transistor having an emitter, a collector and a base for ON-OFF switching, the transistor being connected in series to a path connecting a power source and a load,

means for controlling reapplied voltage which is reapplied between the emitter and the collector of the transistor during the transition period when the transistor is switched to the OFF state to suppress the reapplied voltage at the time the collector current is substantially broken,

said means comprising a resistor, a capacitor and a diode,

means connecting the diode and the resistor in series between the emitter and the collector of the transistor,

means connecting the capacitor between the power source and the junction of the resistor and the diode.

4,010,388

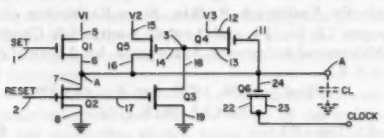
LOW POWER ASYNCHRONOUS LATCH

Cesar E. Alvarez, Jr., Griffith, Ind., assignor to Teletype Corporation, Skokie, Ill.

Filed Feb. 18, 1976, Ser. No. 659,068

Int. Cl.² H03K *3/286, 3/353, 17/04, 17/10*

U.S. Cl. 307—279 **10 Claims**



1. A latch circuit comprising:

a first input terminal;

a second input terminal;

an output terminal;

set means connected to the first input terminal and responsive to a first input pulse applied thereto for establishing a first selected output voltage at the output terminal;

detecting means connected to the output terminal for sensing the presence of the first selected output voltage and for producing an enabling signal exclusively in response to the presence of the first selected output voltage;

swich means responsive to the enabling signal for providing an additional voltage to the output terminal to maintain the voltage at the output terminal at the first selected output voltage;

reset means connected to the second input terminal and responsive to a second input pulse applied thereto for establishing a second selected output voltage, different from the first selected output voltage, at the output terminal; and

means connected to the switch means and operating in conjunction with the reset means, for preventing the switch means from responding to the enabling signal.

4,010,389

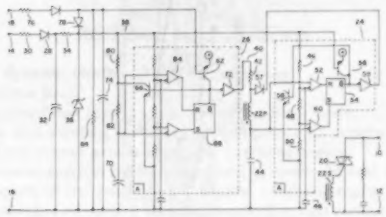
SOLID STATE TIME DELAY AND HOLDING CIRCUIT

William B. Mason, Arlington, Tex., assignor to TECCOR Electronics, Inc., Euless, Tex.

Filed Nov. 24, 1975, Ser. No. 634,421

Int. Cl.² H03K *5/13, 17/60*

U.S. Cl. 307—293 **2 Claims**



1. Circuitry for establishing a connection between a pair of terminals and for opening said connection a predetermined time interval after receiving a predetermined signal comprising:

switch means including a bilateral thyristor connected across said terminals, said switch means including a control input, said switch means being responsive to an enabling signal applied to said control input for establishing said connection and responsive to the removal of said enabling signal from said control input for opening said connection;

pulse generating means connected to said control input, said pulse generating means having an enabling input and responsive to a signal at a predetermined level at said enabling input for generating said enabling signal, said pulse generating means including a pulse transformer having its secondary winding connected to the control input of said switch means; and

timing means for providing said predetermined level signal to said pulse generating means, said timing means including means for receiving said predetermined signal and responsive thereto for removing said predetermined level signal a predetermined time interval after receipt of said predetermined signal, said timing means comprising;

a flip-flop;

a capacitor;

means for charging said capacitor;

discharge means selectively controllable for providing a discharge path for said capacitor;

means for conditioning said flip-flop to a first state when the charge on said capacitor is below a first level;

means for conditioning said flip-flop to a second state when the charge on said capacitor is above a second level, said second level being above said first level;

means responsive to said flip-flop being in said first state for providing said predetermined level signal to said pulse generating means;

means responsive to said flip-flop being in said second state of controlling said discharge means to provide said discharge path; and

means controlling said discharge means to provide said discharge path while said flip-flop is in said first state and responsive to receipt of said predetermined signal for controlling said discharge means to open said discharge path and allow said capacitor to charge.

4,010,390

ELECTROMAGNETIC ACTUATOR COMPRISING A PLUNGER CORE

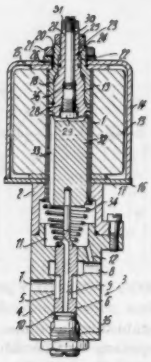
Harald Stampfli, Petit-Saconnex, Switzerland, assignor to Lucifer S.A., Carouge-Geneva, Switzerland

Filed May 16, 1975, Ser. No. 578,362

Claims priority, application Switzerland, May 24, 1974, 7094/74

Int. Cl.² H02K *33/02*

U.S. Cl. 310—30 **4 Claims**



1. An electromagnetic actuator with a plunger core and a stationary ferromagnetic core, both surrounded by an electrical winding, said actuator comprising means for adjusting the axial position of the stationary core in relation to the winding and adjusting the initial attraction force without changing the initial position of the plunger core in relation to the winding, said means being operable from outside the actuator, said stationary core comprising two ferromagnetic parts, one of which is located partly inside the other and is axially displaceable in relation to the outer part, the latter being fixed in relation to the winding and to the external magnetic circuit.

4,010,391

METHOD OF USING MULTIPLE STRESSED SEALING PLUGS TO FILTER POLYMERIC MATERIAL

Peter Gabor Kalman, 51, Compayne Gardens, London, N.W.6, England

Division of Ser. No. 344,414, March 23, 1973, Pat. No. 3,856,674. This application Sept. 24, 1974, Ser. No. 508,813

Claims priority, application United Kingdom, Apr. 19, 1972, 18194/72; Oct. 10, 1972, 46683/72

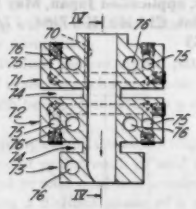
The portion of the term of this patent subsequent to Dec. 24, 1991, has been disclaimed.

Int. Cl.² B01D *29/02*, *33/32*, *35/18*, *33/04*

U.S. Cl. 210—71 **6 Claims**

3. In a process for filtering a substance which is capable of being annealed by heating and cooling same, which has a high coefficient of friction, and which exhibits negligible shrinkage or positive expansion characteristics upon cooling from an elevated temperature flowing through a passage in a filter housing, including the steps of introducing an elongated filter medium in said passage by passing it through inlet and outlet ports which flank said passage and communicate therewith so that a part of the filter extends across the passage, forcing the substance under elevated pressure and temperature conditions through the filter part of the passage to filter the substance, while providing temperature conditions at said inlet and outlet ports resulting in the formation therein of sealing plugs of said substance and, when desired, effecting movement of said filter medium through said ports to introduce another part of said filter into said passage under conditions providing for movement of the plugs of sealing at said inlet and outlet ports, the improvement comprising the steps of:

a. providing at least an outlet port having first, second and third spaced sections in uninterrupted communication with each other for sealing purposes extending away from the passage, the sections being thermally isolated from each other and from the filter housing, with said first section being positioned nearest to the filtering passage



and said third section being positioned furthest from the filtering passage, and said sections being initially filled with substance being filtered under elevated pressure and at an elevated temperature;

b. cooling said port while the substance therein is subjected to elevated pressure to a sufficient extent that a stressed plug if formed therein, the stressed plug being attached to the filter medium and normally blocking the movement of the filter medium through the port;

c. heating and then cooling said second and third sections to substantially anneal the substance in said second and third sections to form a substantially unstressed sealing plug therein, while the stressed plug in said first section remains in place in sealed engagement with the port and in cooled condition;

d. subsequently, when movement of the filter across the passage is required, heating said first section to enable movement of the stressed plug therein along the port and heating said third section while said first section is in such heated condition, the heating of said third section being carried out only to the extent necessary to enable the annealed sealing plug therein to be controllably extruded from the port

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4,010,392

SUBMERSIBLE MOTOR

Alexandr Antonovich Bogdanov, Strastnoi bulvar, 7, kv. 39; Valentin Vasilievich Rodkin, Staro-Kashirskoe shosse, 2, korpus 12, kv. 19, and Anatoly Andreevich Chudinovsky, Khlebozavodskoi proezd, 5, korpus 4, kv. 21, all of Moscow, U.S.S.R.

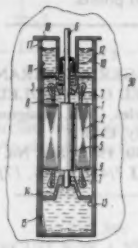
Filed Jan. 20, 1975, Ser. No. 542,398

Int. Cl.² H02K *5/12*

U.S. Cl. 310—87 **5 Claims**

1. A submersible motor for immersion in a surrounding medium comprising, in combination, a housing having a cavity, a motor disposed in said housing cavity, said motor including a rotor and a stator in surrounding relationship with said rotor, a first chamber in the upper portion of said housing

adjacent the upper end face of said motor in sealed relationship with said housing cavity, said first chamber being provided with an opening at the upper portion thereof for communication with the surrounding medium, a second chamber in the lower portion of said housing adjacent the lower end face of said motor and communicating with said housing cavity, a liquid dielectric in said housing cavity and in the upper portion of said second chamber, conduit means within the interior of said housing communicating at opposite ends



with said first and second chambers respectively and a liquid in said first chamber, said conduit means and the lower portion of said second chamber in intimate contact with the liquid dielectric in the upper portion of said second chamber, said liquid having a specific weight greater than that of and unmixable with the liquid dielectric and the surrounding medium for pressurizing said liquid dielectric in said cavity to prevent the penetration of the surrounding medium into said housing cavity.

4,010,393

DYNAMO-ELECTRIC MACHINES

Hugh Olaf Lorch, and Albert Benjamin John Reece, both of Stafford, England, assignors to The English Electric Company, Limited, London, England

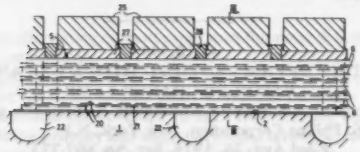
Filed Dec. 12, 1974, Ser. No. 532,047

Claims priority, application United Kingdom, Jan. 11, 1974, 1357/74

The portion of the term of this patent subsequent to Mar. 1, 1994, has been disclaimed.

Int. Cl.² H02K *1/32*

U.S. Cl. 310—194 **11 Claims**



1. A dynamo-electric machine rotor comprising:
a. a rotor body;
b. a winding on the rotor body including a multiplicity of conductors extending axially along the length of the rotor body;
c. a plurality of annular members encircling said conductors at respective positions axially spaced along the rotor body to constrain the conductors against the effects of centrifugal force; and
d. at least one expansible device interposed between the annular members and the conductors of the rotor winding, the expansible device being held in an expanded condition to prestress the annular members to a tensioned condition to clamp the conductors to the rotor body, and to an extent such that stretching of the annular members at the maximum speed of the rotor is substantially prevented.

4,010,394

SUPPORT FOR AN END WINDING OF A ROTOR OF A DYNAMO-ELECTRIC MACHINE

Hugh Olaf Lorch, and Albert Benjamin John Reece, both of Stafford, England, assignors to The English Electric Company Limited, London, England

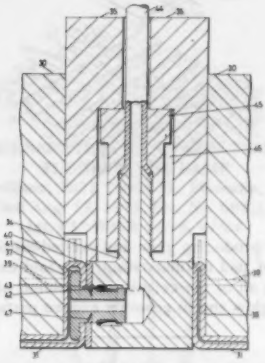
Filed Dec. 12, 1974, Ser. No. 532,048

Claims priority, application United Kingdom, Jan. 11, 1974, 01358/74

The portion of the term of this patent subsequent to Dec. 12, 1991, has been disclaimed.

Int. Cl.² H02K *1/32*

U.S. Cl. 310—194 **12 Claims**



1. A dynamo-electric machine comprising:
a. a rotor body;
b. an overhang region at an end of the rotor body;
c. an end-winding including a multiplicity of conductors which extend axially along the overhang region;
d. annular support means interposed between the said conductors of the end winding and the overhang region;
e. a plurality of annular members encircling said conductors at spaced positions along the overhang region to constrain the conductors against the effects of centrifugal force; and
f. at least one expansible device interposed between the encircling annular members and the conductors forming the end-winding, the expansible device being held in an expanded condition to prestress the annular members to a tensioned condition to clamp the conductors to the support means, and to an extent such that stretching of the annular members at the maximum speed of the rotor is substantially prevented.

4,010,395

GAS DISCHARGE DISPLAY PANEL WITH CELL-FIRING MEANS HAVING GLOW SPREADING ELECTRODE

George E. Holz, North Plainfield, N.J., assignor to Burroughs Corporation, Detroit, Mich.

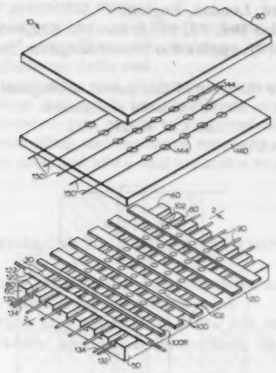
Filed Feb. 9, 1976, Ser. No. 656,656

Int. Cl.² H01J *61/067, 61/54*

U.S. Cl. 313—188 **5 Claims**

1. A display panel comprising
a gas-tight envelope containing an ionizable gas,
a plurality of gas discharge cells, each having spaced-apart discharge electrodes, disposed within said envelope in an array of rows and columns, there being a first column of cells, a last column of cells, and a plurality of intermediate columns of cells therebetween, said cells being adapted to be energized sequentially column by column, beginning with the first and continuing to the last,
a column of reset cells, each having spaced-apart discharge electrodes, adjacent to said first column of gas discharge cells to turn on at the beginning of a scanning cycle,

an auxiliary electrode in said envelope insulated from the gas in said envelope and positioned adjacent to said column of reset cells, and



means for producing glow and excited particles along the length of said auxiliary electrode, said excited particles assisting all of the cells in said column of reset cells to exhibit glow and to generate excited particles.

4,010,396

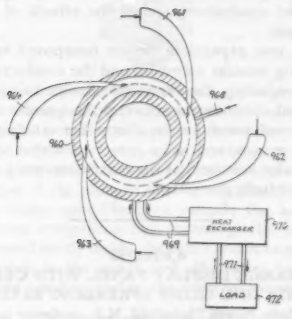
DIRECT ACTING PLASMA ACCELERATOR

Thomas I. Ress, Buena Park, and George V. Nolde, Santa Monica, both of Calif., assignors to Kreidl Chemico Physical K.G., Schaan, Liechtenstein

Filed Nov. 26, 1973, Ser. No. 418,857

Int. Cl.² H01J *3/34;* **H05H** *1/10, 1/12*

U.S. Cl. 313—231.3 **13 Claims**



1. In a reactor for charged particles, comprising in combination:

a central storage vessel enveloping a closed track for the circulation of positively and negatively charged particles, and

a plurality of branch channels opening into said central storage vessel in a tangential direction to said closed track at spaced apart locations, each of said branch channels having an end remote from said central storage vessel provided with a source of substantially equal numbers of positive and negative particles injected in the general direction of the centerline of the respective branch channel and with a set of electromagnets disposed along said centerline; and

control means for periodically energizing the source of particles and the electromagnets of each of said branch channels for producing a dense stream of positive and negative particles circulating in said central storage vessel.

11. A method for accelerating a mixture of positive and negative particles along an open-ended track, comprising the step of injecting a plasma of positive and negative particles into an open-ended track, while applying a magnetic field traveling in a preselected direction relative to each point of said track, with the magnetic flux vector of said field transverse to said track at all points.

4,010,397

FLASHLAMP TRIGGERING ARRANGEMENTS FOR PRESSURIZED GAS COOLED LASERS

David T. Hon, Los Angeles, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Oct. 30, 1975, Ser. No. 627,419

Int. Cl.² H01J *7/44, 13/46, 17/34, 19/78*

U.S. Cl. 315—57 **8 Claims**

1. In combination with a flashlamp having an elongated substantially tubular hermetically sealed housing of dielectric material, an ionizable gas within said housing, and first and second spaced coaxially aligned substantially cylindrical electrodes disposed within said housing at opposite ends thereof, each of said first and second electrodes having a rounded end facing the other of said electrodes, a triggering arrangement comprising:

an electrically conductive patch in intimate contact with a portion of the outer lateral surface of said housing extending over a portion of said first electrode and terminating at a longitudinal location along said housing substantially aligned with the inner end of said first electrode, said first electrode defining a sharp-edged annular rim projecting outwardly from its lateral surface adjacent to said end, an electrically conductive wire electrically connected to said patch and extending along the outer lateral surface of said housing from said patch to at least the vicinity of said second electrode, and means for applying a dc voltage between said first and second electrodes and a trigger voltage between said first electrode and said patch.

4,010,398

ELECTRIC DEVICE PROVIDED WITH A GAS AND/OR VAPOR DISCHARGE LAMP

Willy Frans Lucia Meuwes, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 26, 1975, Ser. No. 607,773

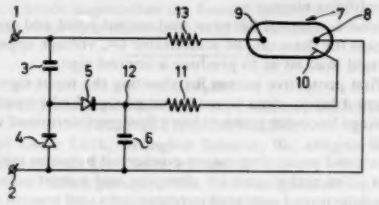
Claims priority, application Netherlands, Sept. 18, 1974, 7412330

Int. Cl.² H05B *39/00, 41/14*

U.S. Cl. 315—101 **14 Claims**

1. An electric device comprising a discharge lamp having an electric discharge tube with at least two main electrodes and an auxiliary electrode, two input terminals adapted for connection to an AC voltage source to supply the lamp with power, a cascade circuit including two series circuits each of which comprises a rectifier and a capacitor in series, means connecting the second series circuit to form a closed circuit with the rectifier of the first series circuit, a first resistor, means connecting an electrode path of the discharge tube and said first resistor in shunt with the capacitor of the second series circuit, said electrode path being formed between the auxiliary electrode and a main electrode of the discharge tube, means connecting the main electrode path formed between

the main electrodes of the discharge tube in series with a current limiting circuit element and in shunt with a part of the cascade circuit, which part comprises at least the capacitor of



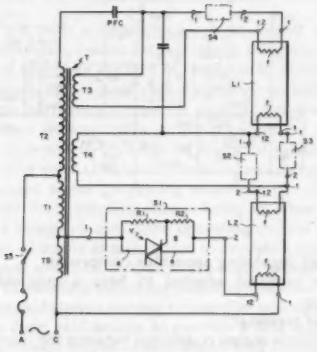
the second series circuit, and means connecting the first series circuit of the cascade circuit directly to the input terminals of the device.

4,010,399

SWITCHING CIRCUIT FOR A FLUORESCENT LAMP WITH HEATED FILAMENTS

Carlo S. Bessone, Cambridge, and Frank M. Latassa, Magnolia, both of Mass., assignors to GTE Sylvania Incorporated, Danvers, Mass.

Filed Dec. 22, 1975, Ser. No. 643,098
Int. Cl.² H05B *41/23*
U.S. Cl. 315—101 **3 Claims**



1. An alternating current rapid start fluorescent lamp ballast circuit comprising:

a rapid start fluorescent lamp including an envelope, emissive filaments spaced apart within the envelope and two leads into the envelope to each filament, the leads comprising primary and secondary lamp terminals for supplying rated arc discharge current between filaments and current through each filament to heat the filament to arc supporting emissive state,

a transformer including a primary winding for alternating line current, a secondary winding connected to the primary lamp terminals, and a tertiary winding in a secondary, heating circuit through secondary lamp terminals and a filament; and

switching means in the secondary circuit including a voltage divider with a junction intermediate the divider, and an electronic valve connected in parallel with the divider, the valve having a control coupled to the junction for causing conduction on each half cycle of alternating current applied across the valve when a break down voltage is applied from the junction to the control,

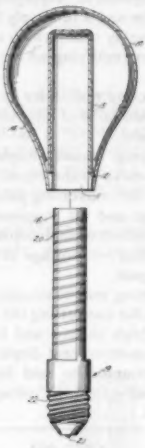
The voltage divider and valve respectively being in series with the lamp terminals and filament such that rated operating current through the lamp produces a voltage at the control lower than the breakdown voltage of the valve, thereby to stop conduction of the valve and limit current through the lamp filaments after the lamp conducts rated operating current.

4,010,400

LIGHT GENERATION BY AN ELECTRODELESS FLUORESCENT LAMP

Donald D. Hollister, 2031 Tweed St., Placentia, Calif. 92670

Filed Aug. 13, 1975, Ser. No. 604,226
Int. Cl.² H05B *41/16, 41/24*
U.S. Cl. 315—248 **28 Claims**



1. A method for producing light from an electrodeless discharge established in an ionizable medium within a sealed envelope including at least one particular ionizable gas at a given pressure capable of emitting radiant energy when subjected to a radio frequency field, the method comprising the steps of:

coupling to the medium an electric field having a magnitude sufficient to initiate ionization of the medium to form a radiation emitting discharge; and

simultaneously coupling to the medium a radio frequency magnetic induction field for maintaining said ionization, said field having a frequency and peak magnitude such that on the average, the free electrons in the medium are accelerated to ionizing velocity in a distance equal to their mean free path in a time approximately equal to one-quarter of the period of said magnetic field, wherein both of said steps of coupling to the medium an electric field and coupling to the medium a radio frequency magnetic induction field comprise the steps of:

positioning an induction coil wrapped around a non-magnetic core in close physical proximity to said medium in said envelope; and

connecting to said induction coil a radio frequency signal.

4,010,401
CONSTANT-VOLTAGE CONVERTER HAVING BEAM CURRENT DETECTOR

Noboru Yasumatsuya, and Mitsuo Isobe, both of Kadoma, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

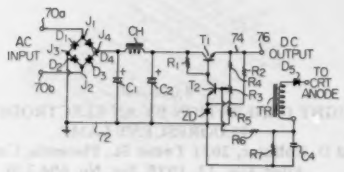
Continuation-in-part of Ser. No. 205,627, Dec. 7, 1971, abandoned. This application Dec. 6, 1973, Ser. No. 422,156

Claims priority, application Japan, Dec. 13, 1970, 45-110818

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² H01J *29/52*

U.S. Cl. 315—379 **8 Claims**



1. A power supply system for supplying a high voltage to an anode of a display tube and a relatively low voltage to deflection circuits of the display tube, which comprises:

rectifying means for rectifying an a.c. input into pulsating d.c.;

beam current detecting means for producing a beam current signal representative of intensity of the beam current of said display tube;

low voltage supplying means coupled to said rectifying means and responsive to the beam current signal of said detecting means for converting pulsating d.c. into a relatively low voltage and for supplying the low voltage to said deflection circuits of said display tube, while regulating the level of said low voltage in accordance with said beam current signal;

high voltage supplying means coupled to said low voltage supplying means for converting the relatively low voltage into a constant high voltage and for supplying the high voltage to said anode of said display tube; and

feedback means coupled to said high voltage supplying means for stabilizing the high voltage of said high voltage supplying means.

4,010,402
LOAD PROTECTIVE CIRCUIT

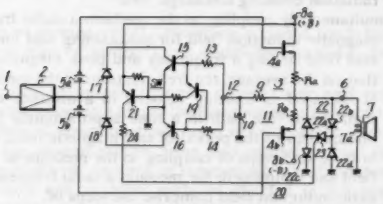
Toshihiko Miyata, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed May 15, 1975, Ser. No. 577,950

Claims priority, application Japan, May 21, 1974, 49-57749[U]

Int. Cl.² H02H *7/20*

U.S. Cl. 361—56 **8 Claims**



1. A load protective circuit comprising:

a. a first voltage source of a first polarity;

b. a second voltage source of a second polarity;

c. first and second amplifying elements connected in series between said first and second voltage sources for amplifying input signals derived from an input circuit;

d. an output point connected between said first and second amplifying elements;

e. a load connected between said output point and ground;

f. means for detecting an undesirable DC voltage appearing at said load so as to produce a control signal;

g. a first protective means for shunting the input signals to ground in response to said control signal when said DC voltage becomes greater than a first predetermined value; and

h. a second protective means connected between said output point and ground for clamping said output point to a predetermined potential in response to said control signal when said DC voltage becomes greater than a second predetermined value which is greater than said first predetermined value.

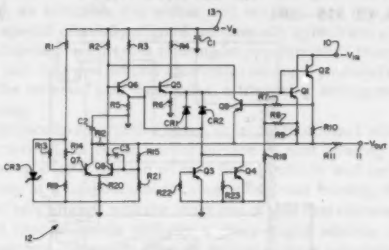
4,010,403
RADIATION PROTECTED SOLID STATE VOLTAGE REGULATING APPARATUS

Albert H. Ashley, Holliston, Mass., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed June 27, 1974, Ser. No. 483,777

Int. Cl.² H02H *7/12*; **G05F** *1/58*

U.S. Cl. 361—18 **7 Claims**



1. Voltage regulating apparatus comprising

an input terminal adapted to have a potential applied thereto;

an output terminal;

pass transistor means connected between the input terminal and the output terminal, current flow through the pass transistor means being controlled by a control signal applied thereto;

voltage reference means coupled to the output terminal for producing a control signal related to the potential at the output terminal;

coupling means for coupling the control signal from the voltage reference means to the pass transistor means;

a change in the potential at the output terminal causing the voltage reference means to change the control signal so as to change the current flow through the pass transistor means to restore the potential at the output terminal to its original value whereby the potential at the output terminal is stabilized; and

protective transistor means coupled to the pass transistor means, said protective transistor means being normally biased in a non-conducting condition and being operable in response to radiation causing the pass transistor means and the protective transistor means to become highly conductive to bias the pass transistor means to a non-conducting condition;

wherein

said pass transistor means includes a pass transistor having a control input electrode connected to the coupling means for receiving the control signal therefrom; and

said protective transistor means includes a protective tran-

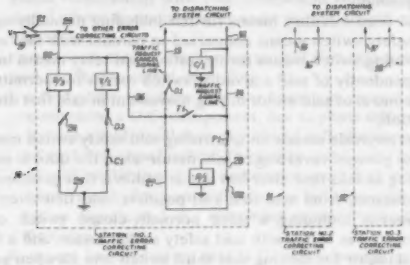
sistor connected in series between said control input electrode and a point of fixed potential, whereby when said protective transistor becomes highly conductive in response to radiation the potential at the control input electrode approaches the fixed potential biasing the pass transistor to a non-conducting condition.

4,010,404

TRAFFIC ERROR CORRECTING CIRCUIT FOR TRAFFIC DISPATCHING SYSTEM

Ronald Louis Lach, Arlington Heights, Ill., assignor to Elec-Tro-Tec, Inc., Elk Grove Village, Ill.

Filed June 6, 1975, Ser. No. 584,360
Int. Cl.² H01H *47/00*
U.S. Cl. 361—179 **7 Claims**



1. For use with a dispatching system circuit operable to control instructing means for selectively assigning traffic to a plurality of receiving stations in response to electrical traffic request signals and request cancel signals from said stations, a traffic error correcting circuit for each said station, comprising: a voltage source; traffic detector means for operating a switch in response to presence of traffic at said station; and first switching means, second time-delay switching means and traffic request signal generating means in circuit with said source; said first switching means being in circuit with said switch and being actuated upon operating thereof in response to presence of traffic at said station to provide a traffic request cancel signal at a first output to the dispatching circuit; de-actuation of said first switching means in response to absence of traffic at said station serving to energize said signal generating means from said source to provide a first traffic request signal at a second output to said dispatching circuit; de-actuation of said first switching means also serving to energize said second time-delay switching means in order to provide an additional traffic request signal at said second output after a predetermined time interval in the absence of traffic at said station during said interval.

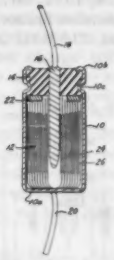
4,010,405

ELECTROLYTIC CAPACITORS WITH PRESSURE-RELIEF AND ELECTRODE STRUCTURE RETAINING MEANS

Fred H. West, Sanford, N.C., assignor to Cornell-Dubilier Electric Corporation, Newark, N.J.

Filed May 8, 1975, Ser. No. 575,487
Int. Cl.² H01G *9/00*; H01M *2/12*
U.S. Cl. 361—433 **9 Claims**

1. An electrolytic capacitor, including a cylindrical case, an electrode assembly in the case impregnated with electrolyte, a terminal extending outside the case from said electrode assembly and a resilient plug forming an end closure of the case, said case embodying sealing means for squeezing the resilient plug and for thereby enforcing sealing contact of the plug to the case and to said terminal and including at least one formation of the case about the plug, said plug and said sealing means being proportioned to release the plug bodily from its position as an end closure in response to internal pressures well below case-rupturing pressures, and barrier means separate from said plug interposed between said electrode assembly and plug and cooperable with a portion of the case for



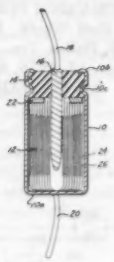
preventing expulsion of said electrode assembly from the case upon release of said plug, said capacitor incorporating a passage bypassing said barrier means for transmitting gas pressure from the electrode assembly to the internal end of the plug.

4,010,406

ELECTROLYTIC CAPACITORS WITH PRESSURE-RELIEF AND METAL ELECTRODE STRUCTURE RETAINING MEANS

Fred H. West, Sanford, and Edward L. Bowling, Broadway, both of N.C., assignors to Cornell-Dubilier Electric Corporation, Newark, N.J.

Filed May 8, 1975, Ser. No. 575,495
Int. Cl.² H01G *9/00*, *9/16*; H01M *2/12*
U.S. Cl. 361—433 **10 Claims**



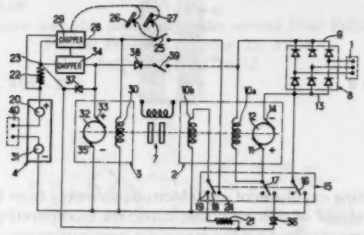
1. An electrolytic capacitor, including a cylindrical metal can, an electrode assembly in the can impregnated with electrolyte, a terminal extending outside the can from said electrode assembly and a resilient plug forming an end closure of the can, said can embodying sealing means for squeezing the resilient plug and for thereby enforcing sealing contact of the plug to the can and to said terminal and including at least one formation of the can about the plug, said plug and said sealing means being proportioned to release the plug bodily from its position as an end closure in response to internal pressures well below case-rupturing pressures, and rigid metal barrier means separate from said plug interposed between said electrode assembly and plug and cooperable with an inward-projecting portion of the cylindrical wall of the can for preventing expulsion of said electrode assembly from the can upon release of said plug, said capacitor incorporating a passage bypassing said barrier means for transmitting gas pressure from the electrode assembly to the internal end of the plug.

4,010,407

ENERGY EXCHANGER FOR AN ELECTRICAL VEHICLE

Claude Lombard, Le Chesnay, France, assignor to Regie Nationale des Usines Renault, Boulogne-Billancourt, France

Filed Mar. 6, 1975, Ser. No. 556,113
Claims priority, application France, Mar. 7, 1974, 74.07789
Int. Cl.² H02P *3/00*
U.S. Cl. 318—63 **6 Claims**



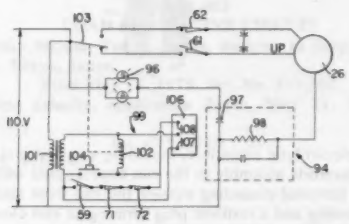
1. An energy exchanger for an electrical vehicle comprising battery means including a first high voltage D.C. rotatable electrical machine with a series excitation coil and a separate excitation coil; a second low voltage D.C. rotatable electrical machine with a separate excitation coil; means for mechanically coupling both said electrical machines with each other and means for coupling both machines with the vehicle's wheels; means for connecting said first machine to an external electrical supply source during battery charging periods; first chopper means for supplying a variable current to said separate excitation coils from said battery; second chopper means for supplying a variable current to the rotor of said second machine and to said series excitation coil; switch means for connecting the separate excitation coil of said first machine to said first chopper means during vehicle drive periods, and connecting said coil to the battery during charging or regenerative periods.

4,010,408

SWITCH MECHANISM FOR DOOR OPERATOR

Morris W. Bailey, Fort Worth, Tex., assignor to Overhead Door Corporation, Dallas, Tex.

Filed Mar. 13, 1975, Ser. No. 557,929
Int. Cl.² H02P *1/42*
U.S. Cl. 318—266 **17 Claims**



1. In a device including a reversible electrical motor connectible to a source of electrical potential for opening and closing a door connected to the motor by drive means, the motor being rotatable in a first direction when the door is being moved toward a first end position wherein it is closed, the motor being rotatable in a second direction opposite said first direction when the door is being moved toward a second end position wherein the door is open, and a mechanism for controlling the motor rotation, said mechanism comprising:

first circuitry means including a first normally-closed switch for connecting the motor in series with the source of potential for rotating the motor in said first direction;

first means responsive to movement in said first direction for opening said first switch as said door moves into said first end position;

second circuitry means including a second normally-closed switch for connecting the motor in series with the source of potential for rotating the motor in said second direction;

second means responsive to movement in said second direction for opening said second switch as said door moves into said second end position;

relay means alternately connecting said source to one of said first and second circuitry means;

third circuitry means connected to said source for operating said relay means, said third circuitry means including normally-open activating switch means for permitting selective actuation of said relay means to permit said door to be selectively moved between its open and closed position;

said third circuitry means further including normally-open safety switch means connected in parallel with said activating switch means for operating said relay means independently of said activating switch means for permitting control of said motor during movement in said first direction;

first override means for overriding said safety switch means to prevent reversing of said motor when the door is moving in said first direction and is within a first preselected distance from said first end position, said first override means including a third normally-closed switch connected in series with said safety switch means and a first actuator for moving said third switch into its open position when the door is moving in said first direction and is spaced said first predetermined distance from said first end position; and

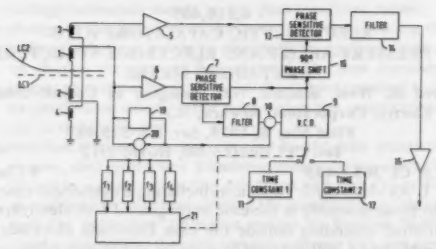
second override means for overriding said safety switch means to prevent reversing of said motor when said door is within a second predetermined distance from said second end position, said second override means including a fourth normally-closed switch connected in series with said safety switch means and said third switch, and a second actuator for moving said fourth switch into its open position when said door is moving in said second direction and is spaced said second predetermined distance from said second end position.

4,010,409

AUTOMATIC VEHICLE GUIDANCE SYSTEMS

Stephen Peter Waites, Maidenhead, England, assignor to EMI Limited, Hayes, England

Filed July 31, 1973, Ser. No. 384,171
Claims priority, application United Kingdom, Aug. 2, 1972, 36070/72
Int. Cl.² G05B *19/100*
U.S. Cl. 318—587 **5 Claims**



1. An automatic vehicle guidance system comprising at least two leader cables, capable of being energised with alternating current of different frequencies and defining different routes to be followed by a vehicle or vehicles, and at least one vehicle having

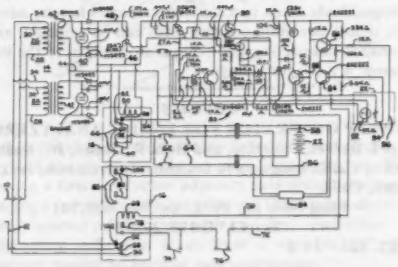
a. sensing means responsive to the current in said cables,
b. means for deriving from said sensing means first and second signals each containing frequency components dependent on alternating currents present in the cables being sensed wherein the phase of said first signal is dependent on the direction of displacement of said vehicle from said cables and the phase of said second signal is substantially independent of displacement,
c. oscillation generating means, comprising a voltage control oscillator having a number of time constant circuits,
d. selection means for deriving from said oscillation generating means an oscillation signal, whose frequency is substantially equal to that of the cable to be followed, by selectively connecting one of said time constant circuits to said voltage control oscillator,
e. phase control means responsive to said second signal for maintaining said oscillation signal in a predetermined phase relationship with that component of said second signal whose frequency is the same as that of said oscillation signal,
f. comparison means, responsive to said first signal and to said oscillation signal, including
i. a first phase sensitive detector having an output signal comprising a D.C. component, due to phase differences between said oscillation signal and a first component, of said first signal, whose frequency is the same as that of said oscillation signal, and one or more A.C. components, due to frequency differences between said oscillation signals and the remaining components of said first signal, and
ii. means for separating said D.C. component from said A.C. components to derive an error signal whose sense is dependent only on the phase relationship between said oscillation signal and said first component, and
g. control means responsive to said error signal for reducing the displacement of said vehicle from the cable to be followed.

4,010,410

RECREATIONAL VEHICLE CONVERTER-BATTERY FAST CHARGING CIRCUIT

Eugene L. Kilbourn, Marshall, Mich., assignor to Progressive Dynamics, Inc., Marshall, Mich.

Filed Apr. 9, 1975, Ser. No. 566,351
Int. Cl.² H02J *7/00, 9/00*
U.S. Cl. 320—31 **11 Claims**



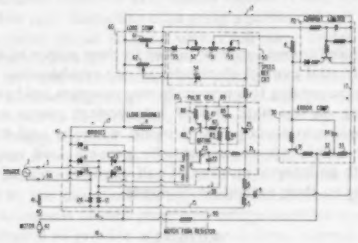
1. A recreational vehicle direct current power supply system comprising, in combination, converter means for converting alternating current to direct current, said converter means having an alternating current input and output rectifying means selectively having a direct current output of a first normal operating voltage or a second lower fast charge voltage, an alternating current power supply connected to said converter means input, first switch means connected to said converter means selectively controlling the output voltage thereof, a rechargeable battery having positive and negative electrodes, second switch means selectively connecting said battery to said converter means output second voltage, a recreational vehicle load circuit, a battery fast charging control circuit connected to said converter means output energized thereby having a control output and connected to said battery sensing the voltage thereof, said control circuit control output operatively connected to and controlling said first and second switch means whereby said control output selectively operates said first switch means to produce said converter means second lower fast charge voltage and said second switch means to connect said battery to said converter means output second voltage, and operates said first switch means to produce said converter means first normal operating voltage and said second switch means to disconnect said battery from said converter means output second voltage when said battery attains a predetermined voltage as sensed by said fast charging control circuit, and third switch means selectively connecting said vehicle load circuit to said battery or said converter means output.

4,010,411

POWER CONVERSION APPARATUS

Franklin O. Wisman, Chambersburg, Pa., assignor to T. B. Wood's Sons Company, Chambersburg, Pa.

Filed Aug. 13, 1975, Ser. No. 605,621
Int. Cl.² H02P *5/16*
U.S. Cl. 323—4 **24 Claims**



1. A power conversion apparatus comprising, controllable rectifier means, means for regulating the voltage output of said rectifier means responsive to a voltage signal level developed in a reference circuit means, means for developing a voltage signal indicative of said rectifier means load current, said reference circuit means including a resistance means having a first terminal at a potential corresponding to a lesser output voltage and a second terminal at a potential corresponding to a greater output voltage, a first connecting means for connecting said load indicative signal to said first terminal, and a second connecting means for transmitting said load indicative signal to said second terminal.

4,010,412

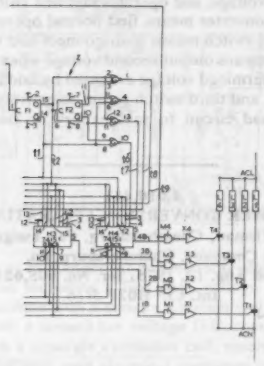
CONTROL OF ELECTRICAL POWER SUPPLIES

George Donald Forman, West Wickham, England, assignor to St. Paul's Engineering Company, London, England

Continuation-in-part of Ser. No. 459,598, April 10, 1974, abandoned, which is a continuation of Ser. No. 345,290, March 27, 1973, abandoned. This application May 8, 1975, Ser. No. 575,712
Claims priority, application United Kingdom, Mar. 27, 1972, 14168/72
Int. Cl.² G05D *23/01*
U.S. Cl. 323—18 **9 Claims**

5. In electrical power distribution apparatus for sharing power between loads having respective independent power controls, said loads being connected in series with respective thyristors each having control electrodes to control the conductive and non-conductive states thereof, said power being derived from a single AC source and shared by said apparatus between said loads so as to avoid exceeding a predetermined

maximum power demand, the apparatus including means for generating a continuous series of pulses timed substantially to coincide with the zero crossing points of the AC supply for controlling said thyristors, the improvement comprising programming means, said programming means including gating means responsive to the state of said independent power controls of said loads to derive respective signals, and pulse steering means connected to receive said respective signals



and said continuous series of pulses to steer pulses in a cyclic manner to said control electrodes of any combination of said thyristors according to a power sharing program, said program depending on the state of said independent power controls and on said maximum power demand, whereby said different thyristor combinations sequentially provide said respective loads with an integral number of half waves of said AC power according to their individual demands.

4,010,413

PLURAL FREQUENCY GEOLOGICAL EXPLORATION SYSTEM AND METHOD WITH PHASE COMPARISON

Donald B. Daniel, Northridge, Calif., assignor to Geo-Nav, Inc., Oklahoma City, Okla.

Continuation of Ser. No. 173,937, Aug. 23, 1971, abandoned. This application Mar. 7, 1975, Ser. No. 556,252

Int. Cl.² G01V 3/12

U.S. Cl. 324—6 **10 Claims**

1. An exploration system for indicating subterranean formations on the basis of at least one plurality of similarly-polarized, low-frequency radiated commensurate signals of respectively different frequencies radiated from a single transmitting station, comprising:

receiver means for sensing said radiated signals of different frequencies and having a frequency of less than 450 kilohertz, as sensed signals, at a location above a formation of interest;

means for processing said sensed signals of different frequencies as sensed by said receiver means to provide a plurality of electrically phase-comparable signals; and

means for electrically phase comparing said phase-comparable signals to provide at least one manifestation of phase difference as in indication of the medium through which said commensurate signals are transmitted and accordingly said formation of interest.

4,010,414

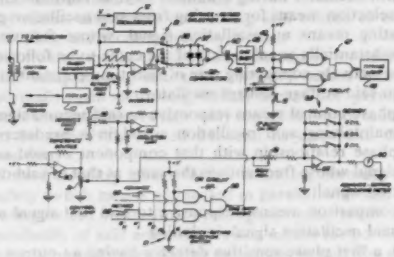
ADVANCE AND RETARD TIMING LIGHT

George I. Reeves, and Jack J. Keegan, both of Fullerton, Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.

Filed Nov. 26, 1975, Ser. No. 635,740

Int. Cl.² F02P 17/00

U.S. Cl. 324—16 T **15 Claims**



1. A timing control circuit for a strobe lamp for use in the adjustment of an internal combustion engine having a fixed reference mark and a moving reference mark with an engine adjustment reference point occurring when said reference marks are aligned, comprising:

means for producing an increasing ramp voltage synchronized with the engine ignition timing;

means for producing a decreasing ramp voltage synchronized with the engine ignition timing;

means for producing a reference voltage including means for varying said reference voltage as a function of the desired amount of deviation of lamp flash from the occurrence of the engine adjustment reference point;

a comparator having first and second input terminals and providing an output pulse when a positive going voltage applied to said first terminal equals a reference voltage applied to said second terminal and when a negative going voltage applied to said second terminal equals a reference voltage applied to said first terminal;

first switch means for connecting said increasing ramp voltage and said reference voltage to said first and second terminals respectively of said comparator when in a first position and connecting said decreasing ramp voltage and said reference voltage to said second and first terminals respectively when in a second position whereby advance or retard deviation of lamp flash can be selected; and

means for connecting said comparator output to the strobe lamp as a trigger voltage.

4,010,415

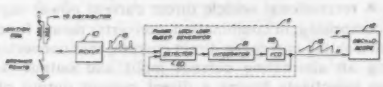
SWEEP GENERATOR FOR ENGINE ANALYZERS

George I. Reeves, Fullerton, and Hoke R. Chism, Jr., Anaheim, both of Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.

Filed Nov. 26, 1975, Ser. No. 635,741

Int. Cl.² G01R 29/00

U.S. Cl. 324—16 S **13 Claims**



1. An improved sweep generator for the oscilloscope of an engine ignition analyzer comprising:

a voltage controlled oscillator having an output and an input, said oscillator generating a ramp voltage at its output having a slope which is a function of the signal applied at its input;

means for connecting the output of said oscillator to the oscilloscope as the sweep signal;

a comparator circuit having a first reference voltage and said ramp voltage output of said oscillator as inputs and producing a feedback signal output when said inputs are equal;

an integrator having a pair of inputs and an output connected to said input of said oscillator whereby the output of said integrator will determine the slope of said ramp voltage output of said oscillator, one of said pair of inputs of said integrator being connected to a second reference voltage;

logic circuit means having a pair of inputs and an output, one of said inputs being connected to the output of said comparator circuit and the other of said inputs being connected to the ignition of an engine being analyzed, said logic circuit means producing an output equal to said second reference voltage when the signals at said pair of inputs are in coincidence, an output greater than said second reference voltage when the signal at one of said inputs is leading the signal at the other of said inputs and an output less than said second reference voltage when the signal at said one input is lagging the signal at said other input;

means connecting the output of said logic circuit means to the other of said pair of inputs of said integrator, and,

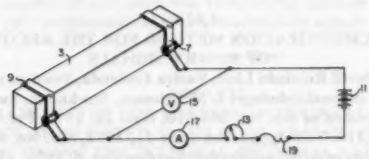
resetting means connected to said input to said oscillator.

4,010,416

METHOD AND APPARATUS FOR TESTING DIELECTRIC ADEQUACY AND FOR INDICATING PHYSICAL DEFECTS IN A NONCONDUCTING MATERIAL

Robert W. Thompson, Pearland, Tex., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 8, 1975, Ser. No. 603,074
Int. Cl.² G01R *31/12, 31/16*
U.S. Cl. 324—54 **7 Claims**



1. A method for testing a nonconductor for dielectric adequacy and for physical defects comprising the steps of:

placing a first conductor adjacent said nonconductor;

placing a second conductor adjacent said nonconductor and in a spaced relationship with said first conductor;

connecting individual leads from a variable DC voltage power source to each of said conductors;

increasing the DC voltage between said conductors to some predetermined value;

indicating the voltage between said conductors as the voltage is increased;

indicating the current flowing between said conductors as said voltage is increased;

responding to a nonlinear increase in the rate of increase of the current relative to a linear increase in the rate of voltage to decrease the rate at which the voltage is increased;

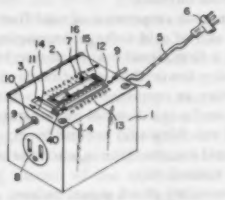
continuing to increase the voltage at a much lower rate until there is a visible mark on the nonconductor outlining the defect.

4,010,417

WATT HOUR METER

Istrate Ionescu, 35-31 85th St., Jackson Heights, N.Y. 11372

Filed Jan. 27, 1976, Ser. No. 652,893
Int. Cl.² G01R *27/22*
U.S. Cl. 324—94 **7 Claims**



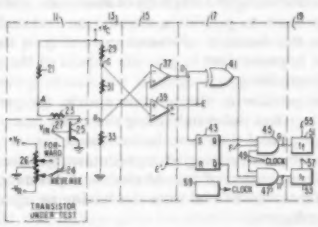
1. A watt hour meter comprising a coulombmeter employing two columns of mercury interposed by an electrolyte solution confined within an extended hollow glass tube having substantially elongated coaxial metallic ferrules at each free end of said glass tube, each of said metallic ferrules electrically contacting the non-electrolyte contacting end of each column of mercury, said ferrules are manually detachably contacting two stationary snap-in type mounting contacting clips adapted to permit axial lateral motion of said coulombmeter while said contacting clips grasp a portion of said ferrules, an electrical circuit adapted with a full wave bridge rectifier circuit in series with a utility outlet receptacle and a line cord whose free end is terminated with a utility electrical plug, said bridge rectifier circuit providing a direct current component proportional to an alternating flow through the input terminals of said bridge rectifier circuit when an external electrical lead apparatus is energized during the time period that it is electrically connected to said series utility outlet receptacle accompanied by the simultaneous application of alternating voltage to the terminals of said plug, said bridge rectifier circuit further adapted to provide a proportional direct current component through said coulombmeter when a source of non-periodically reversing voltage is applied to said plug and an electrical load operated by direct current is electrically energized by connection to said utility outlet receptacle, said coulombmeter adapted for convenient manual electrical reversal by interchanging said ferrules in contact with said stationary mounting clips.

4,010,418

TRANSISTOR CIRCUITS

Leonard Robert Salvatore, Greenbrook, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Mar. 13, 1975, Ser. No. 558,147
Int. Cl.² G01R *31/26*
U.S. Cl. 324—158 T **7 Claims**



1. A transistor test circuit for measuring the time required for the current passing through the conduction path of a transistor to pass from a first to a second value when the transistor is switched from a nonconducting to a conducting state and for measuring also the time required for this current

to pass from the second to the first value when the transistor is switched from its conducting to its nonconducting state comprising, in combination:

means for translating said current to a voltage proportional thereto;

means for providing first and second reference voltage levels indicative of said first and second values, respectively, of said current;

comparator means respective of said first and second voltage levels and of said voltage proportional to current for producing a first signal manifestation in response to said voltage being lower than said first level, a second signal manifestation in response to said voltage reaching said first level, and a third signal manifestation in response to said signal reaching said second level;

first and second counter means, each for counting at a given rate when turned on;

means for providing clock signal pulses;

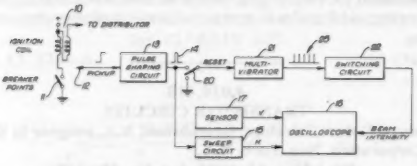
AND gate means having at least one input terminal receptive of said clock signals; and

means responsive to the order of occurrence of said first, second, and third signal manifestations, for priming said AND gate means to deliver clock pulses to said first counter, whenever said second signal manifestation follows said first signal manifestation, and thereafter disabling said AND gate means when said third signal manifestation is attained, and for priming said AND gate means to deliver pulses to said second counter, whenever said second signal manifestation follows said third signal manifestation, and thereafter disabling said AND gate means when said first signal manifestation is attained.

4,010,419
IGNITION ANALYZER TIME BASE

George I. Reeves, and Donald D. Richards, both of Fullerton, Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.

Filed Nov. 26, 1975, Ser. No. 635,743
Int. Cl.² F02P *17/00*
U.S. Cl. 324—16 S **8 Claims**



1. In an engine analyzer for analyzing the performance of the ignition system of an internal combustion engine and incorporating an oscilloscope having an electron beam source, means for controlling the intensity of the beam, and means for moving the beam to provide a visible trace related in sweep duration to the duration of events occurring in the ignition system, the improvement to provide indicia of the passage of real time comprising:

means responsive to the ignition system for generating a first electrical pulse indicating the point from which the passage of real time is to be indicated;

oscillator means running at a predetermined frequency to provide an output of second electrical pulses at predetermined intervals of real time and having an input for starting oscillation;

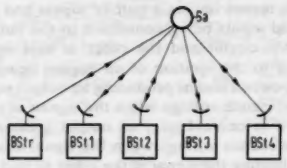
means for connecting said first pulse to said oscillator input; and,

means for connecting said second pulses to the beam intensity control of the oscilloscope whereby said second pulses will produce indicia in the trace at real time intervals.

4,010,420
SATELLITE COMMUNICATIONS TRANSMISSION APPARATUS AND METHOD

Udo Reiner, and Jochen Zilg, both of Munich, Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Jan. 13, 1975, Ser. No. 540,548
Claims priority, application Germany, Jan. 14, 1974, 2401604
Int. Cl.² H04B *7/19*
U.S. Cl. 325—4 **6 Claims**



1. A method of satellite communication whereby signal transmission bursts of different ground stations are provided with a preamble and are arranged in a time-multiplex manner and are combined to form a frame at the satellite station and are re-transmitted comprising the steps of transmitting an initial access signal by a ground station, receiving and retransmitting said access signal by said satellite station, receiving said access signal at said ground station and evaluating its position in the frame assigned to said ground station, adjusting the phase position of a preamble transmit burst which is to be transmitted by said accessing ground station and the phase position of the preamble transmit burst controlled with respect to its desired phase position by using burst phase regulation control, and evaluating the initial access signal and controlling the transmission phase to a desired intermediate phase position which is delayed with respect to the desired phase by a known time and shifting the phase with a program control of the preamble transmit burst to the desired phase position from the desired intermediate phase position and then transmittng the entire burst.

4,010,421
SYNCHRONIZATION METHOD FOR THE RECOVERY OF BINARY SIGNALS

Kurt Bertil Reinhold Lind, Vastra Frolunda, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Division of Ser. No. 308,810, Nov. 22, 1972, Pat. No. 3,838,214. This application June 11, 1974, Ser. No. 478,234
Claims priority, application Sweden, Dec. 6, 1971, 15633/71
The portion of the term of this patent subsequent to Sept. 24, 1991, has been disclaimed.
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976
Int. Cl.² H04L *7/02;* **H03K** *13/24*
U.S. Cl. 325—38 A **6 Claims**

1. In an information transmission system having a transmitter side wherein a first binary signal representing information bits is converted to a multilevel signal representing the same information bits such that the instantaneous level of the multilevel signal is correlated to the first binary signal and a receiver side wherein the multilevel signal is converted to a received binary-signal conforming with the first binary signal, a method for recovering, at the receiver side, bit timing information during the transmission of signals in the system comprising the steps of:

a. forming a plurality of series of clock signals by the detection of the instants at which the multilevel signal attains and/or leaves at least one specific signal level, each of said clock signals being phase locked to the received multilevel signal at a different one of a plurality of alter-

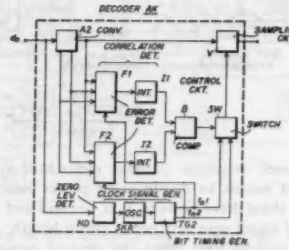
native relative phase positions with respect to the multilevel signal but with only one of such positions being correct;

b. converting the multilevel signal to a plurality of intermediate binary signals;

c. generating from the intermediate binary signals pluralities of further binary signals logically related to the levels of the multilevel signal, each of the pluralities being generated at times determined by different ones of the series of clock signals;

d. temporarily storing the pluralities of further binary signals whereby, at later times, signals related to certain levels of the multilevel signal are available;

e. correlating to deterime at times established by each of the series of clock signals whether a particular relationship



exists between the intermediate binary signals and a specific combination of preceding values of the multilevel signal as represented by each of the pluralities of further binary signals associated with each of the series of clock signals respectively, said particular relationship being determined by the correlation between the multilevel signal and the first binary signal at the transmitter side; and

f. selecting one of the series of clock signals for establishing the bit timing relationship on the receiver side because of the correctness of its phase relation with respect to the information bits of the multilevel signal, said one of the series of clock signals being that which results, over a period of time, in the greatest number of agreements with respect to said particular relationship between said specific combination and the intermediate signals.

4,010,422

TRANSMITTER FOR FORMING NON-LINEAR PULSE CODE MODULATED SAMPLES OF ANALOG SIGNALS BY TIMING THE INTEGRAL OF SIGNAL SAMPLES

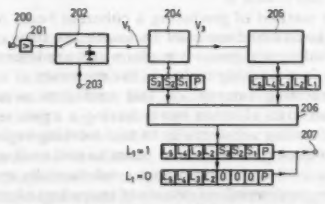
Kornelis Jan Wouda, Hilversum, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 188,762, Oct. 13, 1971, abandoned. This application Oct. 25, 1973, Ser. No. 409,425

Claims priority, application Netherlands, Oct. 15, 1970, 7015118

Int. Cl.² H04B 1/04

U.S. Cl. 325—141 **7 Claims**



1. A transmitter for forming non-linear pulse code modulated signals from analog signals, in which the amplitude range of the analog signals is divided into segments, comprising means for forming signal samples of said analog signals, a first analog-to-digital converter for converting the amplitude values of the samples of the analog signals into segment code words specifying the segments containing the amplitude values; an amplitude controller coupled to the first analog-to-digital converter and to the samples of the analog signals and having a sawtooth-shaped control characteristic, the amplitude controller comprising an integrator to which each analog signal sample is applied, a threshold unit connected to the integrator, and a control member for terminating the integration at a number of fixed timing control instants after the starting timing instant of each signal sample, said control member being in operation when the integrator voltage exceeds the threshold voltage of the threshold unit and at the last control timing instant of the said number of control timing instants; and a second analog-to-digital converter to which the amplitude-controlled signal samples from the integrator are applied for converting the controlled analog amplitude values from the integrator into amplitude code words specifying the controlled amplitude values.

4,010,423

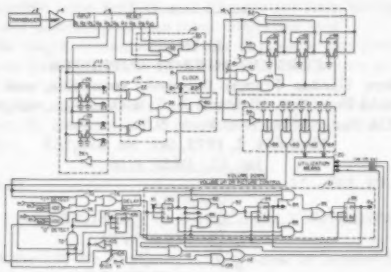
MULTI-FUNCTION REMOTE CONTROL IC

Johnny Collins, Oak Park, and Charles H. Heuer, Glencoe, both of Ill., assignors to Zenith Radio Corporation, Chicago, Ill.

Filed June 26, 1975, Ser. No. 590,771

Int. Cl.² H04B 1/16

U.S. Cl. 325—391 **5 Claims**



1. A television remote control device for selectively activating functions of a television receiver in response to a plurality of actuating signals of different frequencies received from a remote location, said device including means for receiving and processing said actuating signals, means for actuating said functions and an integrated circuit, said integrated circuit having a predetermined number of connection pins and comprising:

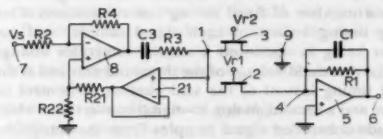
counting means for distinguishing among the processed plurality of actuating signals based on frequency and having outputs indicative thereof; and

logic means coupled between said counting means and said actuating means for enabling, via output pins, said actuating means based upon said counting means outputs and being responsive to external voltages applied to one of said connection pins for selectively operating in a first mode in which actuating signals of two predetermined frequencies control a multi-state bi-directional function from said output pins and in a second mode in which said actuating signals of two predetermined frequencies control a cyclic multi-state function and a distinct bi-stable function from said output pins.

4,010,424
PHASE-SENSITIVE DETECTOR CIRCUIT WITH COMPENSATION FOR OFFSET ERROR

Eric Andrew Faulkner, Cookham Dean, England, assignor to Brookdeal Electronics Limited, Bracknell, England

Filed Apr. 8, 1975, Ser. No. 566,680
Claims priority, application United Kingdom, Apr. 8, 1974, 15468/74
Int. Cl.² H03F 1/02
U.S. Cl. 330—9 **12 Claims**

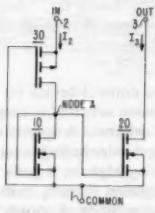


1. A phase-sensitive detector circuit characterised in that it comprises in combination a pair of switching devices joined at a switching point and arranged for control by reference switching signals in antiphase, an a.c. coupling between a signal input terminal and the said switching point, an output operational amplifier including a feedback path from the output thereof to an input thereof whereby to hold said input virtually at ground potential in the absence of any offset voltage in said operational amplifier, a connection from one of the switching devices to an input of the output operational amplifier, a connection from the other of the switching devices to a terminal which is at ground potential, and a compensation circuit the input to which is supplied from the said switching point and the output from which is applied to the input side of said a.c. coupling for the purpose of providing a compensating signal to tend to eliminate the effect of any offset voltage occurring in the output operational amplifier.

4,010,425
CURRENT MIRROR AMPLIFIER

Andrew Gordon Francis Dingwall, Somerville, and Bruce David Rosenthal, Highland Park, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Oct. 2, 1975, Ser. No. 618,763
Int. Cl.² H03F 3/16
U.S. Cl. 330—35 **10 Claims**

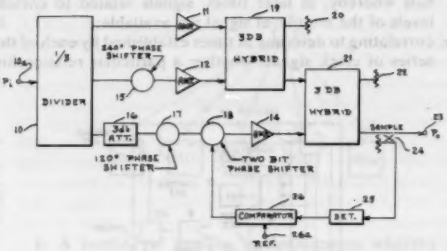


1. A current mirror amplifier, comprising, in combination:
an input terminal, a common terminal, an output terminal and a node;
first and second field effect transistors of a first conductivity type, the source electrode of each being coupled to said common terminal, the gate electrode of each and the drain electrode of the first being coupled to said node, the drain electrode of the second being coupled to said output terminal; and amplifier means having an input electrode coupled to said input terminal, an output electrode coupled to said node and a control electrode coupled to said common terminal for maintaining the impedance between said input terminal and said common terminal at a value less than the reciprocal of the transconductance of said first field effect transistor.

4,010,426
RF POWER AMPLIFIER PARALLEL REDUNDANT SYSTEM

Sheldon I. Rambo, Baltimore, Md., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Nov. 12, 1975, Ser. No. 631,290
Int. Cl.² H03F 3/60
U.S. Cl. 330—53 **2 Claims**



1. RF power amplifier parallel redundant system being comprised of means to divide input power into equal first, second, and third drive powers, first, second and third power amplifiers of equal gain and equal phase length, each power amplifier providing four times the desired power, said first drive power being fed to said first power amplifier, first means to phase shift said second drive power 240° prior to reception thereof by said second power amplifier, second means to phase shift 120° said third drive power, a two bit 0°, 60° phase shifter normally in the 60° position with said three power amplifiers in operation, the output of said two bit 0°, 60° phase shifter being connected to the input of said third amplifier, the 120° phase shifted drive power passing through said two bit phase shifter, first and second 3 db hybrids, said first 3 db hybrid combining the output powers from said first and second power amplifiers, a first load for said first 3 db hybrid absorbing a portion of the drive powers combined in said first 3 db hybrid, the remainder being applied to said second 3 db hybrid, the output power of said third power amplifier also being applied to said second 3 db hybrid, a second load for said second 3 db hybrid absorbing a portion of the two powers combined in said 3 db hybrid, and the remainder being the system output power, a directional coupler sampling said system output power, means to detect said system output power, and means to compare the sampled system output power to a preselected reference to provide a control signal therefrom to said two bit 0°, 60° phase shifter for shifting thereof upon the malfunctioning of at least one of said power amplifiers.

4,010,427
LASER OUTPUT CONTROL SYSTEM

Diarmaid H. Douglas-Hamilton, and Ethan D. Hoag, both of Boston, Mass., assignors to Avco Everett Research Laboratory, Inc., Everett, Mass.

Filed Mar. 8, 1976, Ser. No. 664,656
Int. Cl.² H01S 3/10
U.S. Cl. 331—94.5 S **9 Claims**

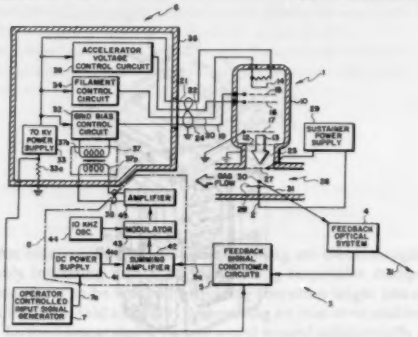
1. In a method of producing a coherent beam of radiation from a gaseous medium in an enclosure, the steps comprising:
a. providing said gaseous medium at a predetermined pressure in a working region in the enclosure;
b. generating external of said enclosure a substantially broad area electron beam having a cross section area conforming substantially to said working region;
c. introducing said electron beam to said enclosure to produce in the working region a substantially spatially uniform predetermined density of secondary electrons in the medium;

d. providing an electric field in the working region which increases the average energy of said secondary electrons therein without substantially increasing the electron density therein;

e. the energy of said secondary electrons being sufficient to stimulate the emission of said coherent beam of radiation;

f. causing said beam of coherent beam of radiation to emanate from the enclosure;

g. sequentially intercepting the emanating beam of coherent



radiation at substantially regular intervals by elongated small diameter wires spaced one from another and having an outer surface substantially reflective to said coherent radiation to provide reflected pulses of radiation;

h. collecting and converting said reflected pulses of radiation into an electrical feedback signal representative of the power thereof; and

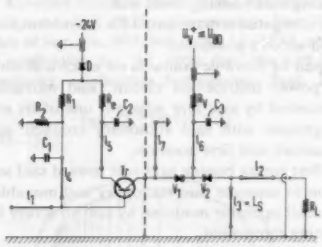
i. employing said electrical feedback signal to control the electron beam, thereby providing a feedback system for controlling the coherent beam of radiation.

4,010,428

TRANSISTOR OSCILLATOR UTILIZING CLAPP CIRCUIT CONFIGURATION FOR OPERATION IN THE MICROWAVE BAND

Anton Sunkler, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Sept. 15, 1975, Ser. No. 613,515
Int. Cl.² H03B 5/24; H03C 3/22
U.S. Cl. 331—117 R **11 Claims**



1. In a transistor oscillator for the microwave band, utilizing CLAPP circuit configuration, the combination of a small capacitance in series with the collector-base capacitance and disposed between the base and ground, said additional capacitance comprising a line section open at the end, the electrical length of which line is smaller than λ/4.

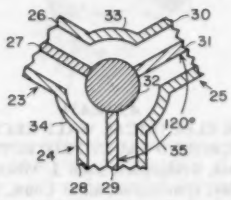
2. In a transistor oscillator, constructed in strip-line technique, for the microwave range, utilizing CLAPP-circuit configuration, having a capacitive voltage divider comprising the collector-emitter capacitance and the emitter-base capacitance, and provided with an adjustable capacitance connected in series with the resonant circuit inductance in the collector circuit, with the collector-base capacitance forming a part of the capacitance reactance of the frequency-determining elements of the oscillator circuit, the combination of an additional small capacitance disposed between the transistor base and ground and connected in series with the collector-base capacitance, operative to reduce the effective circuit capacitance and thereby increase the oscillator frequency, and line sections of λ/4 in length forming the direct current feed to the transistor, of which the end connected to the voltage source is short-circuited over a blocking condensor.

4,010,429

COAXIAL DISC-JUNCTION POWER DIVIDER

Aare Kivi, Massapequa, N.Y., and Louis Feit, Fairlawn, N.J., assignors to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed Jan. 7, 1976, Ser. No. 647,019
Int. Cl.² H01P 5/12
U.S. Cl. 333—9 **8 Claims**



1. A coaxial transmission line power divider consisting of:

three coaxial transmission lines extending outwardly from a junction area, each of said transmission lines having an outer conductor and an inner conductor, and

a solid single element metallic disc disposed at said junction area directly connected to said inner conductors of said three transmission lines,

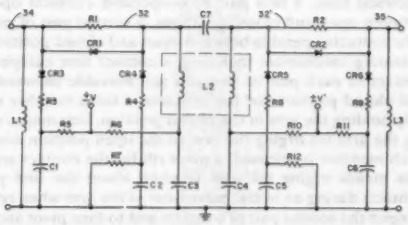
said outer conductors of said three transmission lines being directly interconnected to each other to surround said disc.

4,010,430

LOW LOSS, BROADBAND SWITCHABLE MICROWAVE STEP ATTENUATOR

Allen Robert Wolfe, Sauquoit, N.Y., assignor to General Electric Company, Utica, N.Y.

Filed Oct. 17, 1975, Ser. No. 622,923
Int. Cl.² H01P 1/22
U.S. Cl. 333—81 A **7 Claims**



7. A switchable, microwave step attenuator comprising, in combination:

an insulative substrate having a ground plane conductor on one surface;

a transmission line including attenuation resistance means

supported on the surface of said substrate opposite said ground plane surface;

diode switching means connected to said transmission line for altering the impedance properties thereof; and

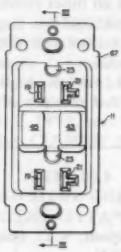
a pair of open end stub networks connected to said transmission line on either side of said attenuation resistance means for selectively providing an impedance-matched ground shunt connection under control of said diode switching means, said open end stub networks comprising a plurality of conductive segments connected to each other and to said transmission line by resistive elements, the resistance values of said elements and the line length and impedance values of said conductive segments being such that the impedance value of said network is substantially constant over a broadband of microwave frequencies.

4,010,431

SWITCH FOR ELECTRICAL WALL RECEPTACLE WITH GROUND FAULT PROTECTION

Gopal J. Virani, Bridgeport; John J. Misencik, Shelton, and Roy O. Wiley, Huntington, all of Conn., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 29, 1975, Ser. No. 609,134
Int. Cl.[2] H01H *83/02*
U.S. Cl. 335—18 **10 Claims**



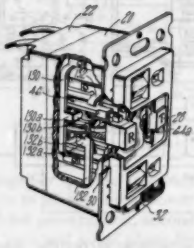
1. An electric receptacle for mounting in a wall outlet box for connecting an electrical load to the conductors of a power source, comprising socket means for receiving a plug of an electrical load, a first pair of cooperable contacts operable between open and closed positions, a second pair of cooperable contacts operable between open and closed positions, an operating mechanism including a contact arm carrying one contact of each pair of contacts and movable between open and closed positions of the contacts, a latch member releasably holding the arm in the closed position, bias means engaging the arm for urging the arm to the open position when the latch member is released, a pivot rib for the contact arm, the bias means urging the arm to pivot about the first pair of contacts during an initial movement of the arm when released to open the second pair of contacts and to then pivot about the pivot rib during a final movement of the arm to open the first pair of contacts, ground fault sensing means for monitoring the flow of current through the socket means, and release means responsive to the fault sensing means for releasing the latch member from the contact arm, whereby the first and second pairs of contacts are opened sequentially.

4,010,432

ELECTRICAL RECEPTACLE EQUIPPED WITH GROUND FAULT PROTECTION

Keith W. Klein, Simsbury; Joseph M. Palmieri, Southington, both of Conn., and George J. Lawrence, North Kingstown, R.I., assignors to General Electric Company, New York, N.Y.

Filed Oct. 22, 1975, Ser. No. 624,720
Int. Cl.[2] H01H *73/06*
U.S. Cl. 335—18 **11 Claims**



1. An electrical receptacle equipped to provide ground fault protection, said receptacle comprising, in combination:

A. an insulative housing;

B. means forming at least one socket in a front wall of said housing, said socket including a pair of connectors within said housing for making electrical contact with the stabs of an appliance cord plug inserted into said socket;

C. a pair of stationary contacts mounted within said housing and respectively electrically connected to said socket connectors;

D. a support plate mounted within said housing;

E. an electronics-magnetics module mounted to the side of said plate opposite said housing front wall; and

F. an operating mechanism including

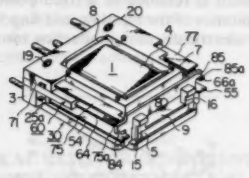
1. a mounting structure affixed to the side of said plate facing said housing front wall,
2. an elongated arm mounted for movement between first and second positions,
3. a pair of movable contacts for electrical connection to a power distribution circuit, said movable contacts mounted by said arm adjacent one of its ends for engagement with said stationary contacts as said arm assumes said first position,
4. a first spring biasing said arm toward said second position to separate said stationary and movable contacts,
5. a reset operator mounted by said structure for reciprocating movement,
6. a second spring biasing said operator toward said housing front wall for protrusion through an opening therein,
7. a latch mounted by said operator, said latch engaging said arm to enable said second spring to move said arm to its first position, and
8. a trip solenoid mounted by said structure and including a plunger arranged to strike said latch upon energization of said solenoid under the control of said module, thereby releasing said arm for movement to its second position by said first spring.

4,010,433

ELECTROMAGNETIC RELAY

Hiromi Nishimura, Takaishi; Kenji Ono, Neyagawa; Katsumi Tachibana, Tsu, and Satoru Furukawa, Kadoma, all of Japan, assignors to Matsushita Electric Works, Ltd., Osaka, Japan

Filed July 28, 1975, Ser. No. 599,640
Claims priority, application Japan, Aug. 22, 1974, 49-97316
Int. Cl.² H01H 50/04
U.S. Cl. 335—129 9 Claims



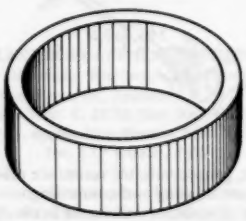
1. An electromagnetic relay comprising an electromagnet assembly including means for positioning respective component members to be stacked providing thereto a single assembling direction, said assembly comprising an iron core and coil frame formed integral and having a coil wound substantially in the middle, an armature to be attracted to said iron core of the electromagnet assembly when said coil is excited, a balance spring formed to provide a constant spring force to said armature resistive to attracting force thereto of said electromagnet assembly and stacked on the electromagnet assembly through said positioning means, first and second contact spring blocks having normally closed contacts and normally opened contacts respectively positioned on each side along longitudinal axis of said electromagnet assembly and stacked on said balance spring through the positioning means, a card normally biased by said balance spring to non-attracted position of the armature and adapted to open said normally closed contacts and to close said normally opened contacts in response to the attracted movement of the armature, and a casing adapted to house therein a stacked assembly unit of respective said members, said positioning means including guide posts and respective said members to be stacked on the electromagnet assembly are provided with holes through which said guide posts are inserted.

4,010,434

RADIALLY ANISOTROPIC MAGNET BODY

Franciscus Xaverius Nicolaus Maria Kools, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 507,366, Sept. 18, 1974, abandoned.
This application Jan. 14, 1976, Ser. No. 649,140
Claims priority, application Netherlands, Sept. 26, 1973, 7313231
Int. Cl.² H01F 7/02
U.S. Cl. 335—302 1 Claim



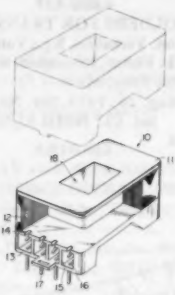
1. A curved, sintered, radially anisotropic, permanently magnetisable body essentially consisting of a ferrite of the formula $MeO.6Fe_2O_3$, wherein Me is at least one of the metals barium, strontium and lead, said body having a closed annular shape with an inside diameter which is at least 0.8 times the outside diameter.

4,010,435

TERMINALS FOR COIL BOBBIN

Katumi Shigehara, 1729, Kashiya, Ebina, Kanagawa, Japan

Filed June 3, 1976, Ser. No. 692,434
Claims priority, application Japan, June 4, 1975, 50-66403; Dec. 10, 1975, 50-165628
Int. Cl.² H01F 15/10
U.S. Cl. 336—192 5 Claims



1. Terminals and a coil bobbin comprising a flange plate provided on one end of the tubular portion of a coil bobbin and provided with notches of a number corresponding to the number of required terminals, an another flange plate spaced from said flange plate and provided with holes for passing terminal pins of a number corresponding to the number of required terminals, and terminal elements each composed of a pin formed into a substantially U-shape and pressed in between said flange plates with an end passing through said hole.

4,010,436

ELECTRICAL INDUCTIVE APPARATUS

Garlington C. Wilburn, South Boston; John G. Aldworth, Halifax, both of Va.; Robert Lugosi, Monroeville, and Alan T. Male, Franklin Borough, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Apr. 15, 1976, Ser. No. 677,332
Int. Cl.² H01F 27/28
U.S. Cl. 336—223 11 Claims

1. A transformer, comprising:
a magnetic core,
and a winding structure disposed in inductive relation with said magnetic core,

said winding structure including a plurality of conductor turns formed of an electrically conductive material having a predetermined cross sectional configuration,

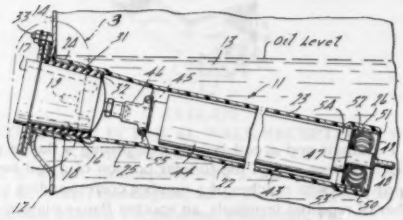
said plurality of conductors turns being arranged such that at least certain of the conductor turns are aligned in a first axially extending layer of conductor turns, with said predetermined cross sectional configuration of the electrically conductive material providing an interlocking structure in which each conductor turn includes at least two portions which axially overlap other conductor turns of said winding to restrain the conductor turns of the first axially extending layer against relative axial movement.

4,010,437

FUSE HOLDERS FOR TRANSFORMERS

Herbert J. Macemon, Versailles, Ky.; Vance Martin, Charlotte, N.C., and John L. Fisher, Lexington, Ky., assignors to Kuhlman Corporation, Troy, Mich.

Filed Aug. 26, 1974, Ser. No. 500,584
Int. Cl.² H01H *85/02*
U.S. Cl. 337—204 **10 Claims**



1. In a fuse holder for a transformer having a front plate, a housing of dielectric material for enclosing a fuse, the outer end of this housing passing through an apertured portion of the transformer front plate, means securing the outer end of the housing to the front plate, an adapter sleeve of resilient material mounted within the outer end of the housing, the inner surface of this adapter sleeve being tapered in an inward direction, a bushing well with a complementary taper disposed within said adapter sleeve, means connecting said bushing well to a fuse, and means removably clamping the bushing well in compressed relation with the adapter sleeve, whereby removing said clamping means will permit the bushing well and fuse to be withdrawn from the housing, said clamping means comprising a flange on said bushing well, a disc like clamp engaging said flange, a plurality of studs secured to said front wall, and nuts on said studs engaging said clamp.

2. The combination according to claim **1**, said housing securing means comprising a flange on said housing, a gasket between said housing flange and front plate, a disc-like fuse holder clamp, and nuts on said studs holding said fuse holder clamp against said housing flange.

4,010,438

TERMINATOR MEMBER FOR FUSIBLE ELEMENT OF A HIGH VOLTAGE FUSE

Henry W. Scherer, Mount Prospect, Ill., assignor to S & C Electric Company, Chicago, Ill.

Filed Nov. 19, 1975, Ser. No. 633,486
Int. Cl.² H01H *85/38*
U.S. Cl. 337—232 **2 Claims**

1. In a high voltage fuse including a hollow cylindrical insulator housing, metallic end ferrules closing the ends of said housings, a support assembly for supporting at least one helically wound fusible element within the housing, granular electrically non-conducting insulating material in the housing surrounding the fusible element; an improved terminator arrangement for positioning the at least one fusible element within the fuse comprising:

a flat portion having an opening at the center thereof, said opening for receiving an end of the support assembly and said opening having engaging projections extending outwardly toward one another from opposite sides thereof for engaging and positioning the support assembly in a predetermined position;

positioning fingers joined to and extending from said flat portion in the same plane as said flat portion, said positioning fingers positioned around said flat portion, said fingers dimensioned to rest against the interior of the hollow cylindrical insulator housing so that said terminator arrangement is retained in a fixed position with respect to the interior of the housing, said fingers permitting the granular electrically non-conducting insulating material to be inserted around the fusible element after the terminator arrangement has been positioned in the housing;

a first tab joined to and extending from an edge of said flat circular portion in a direction essentially perpendicular to the path of the helically wound fusible element, said first tab having serrations on at least one surface thereof whereby said fusible element can be welded to said first tab without distortion or bending and at reduced welding temperatures;

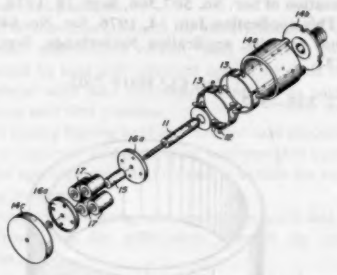
a second tab joined to and extending from said flat central portion in a direction perpendicular to said flat portion and in an opposite direction from said first tab, said second tab being adapted to be connected with the end ferrules to provide an electrical connection therewith.

4,010,439

PLANETARY POTENTIOMETER ASSEMBLY

Melvin Arthur Lace, Prospect Heights, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Oct. 31, 1975, Ser. No. 627,643
Int. Cl.² H01C *10/20, 10/28*
U.S. Cl. 338—125 **7 Claims**



1. A multiple, ganged variable resistance assembly having a single cyclindrical housing and comprising:

a multiplicity of resistance elements in two circumferential lines around the interior of the curved housing wall and forming substantially parallel pairs;

terminal means penetrating the housing wall for making contact with the resistance elements;

a shaft rotatably and axially mounted on the housing and extending through the top thereof;

an insulating, resilient, friction drive surface surrounding and fixably mounted on a portion of the shaft within the housing;

a multiplicity of substantially cylindrical members equally spaced around and with axes parallel to the shaft axis, the cylindrical members being electrically conductive, each member being arranged to contact and be driven by the friction drive surface on the shaft and being dimensioned to contact one pair of resistance elements in any rotational position of the shaft; and

two spaced apart insulating members mounted on the shaft adjacent the ends of the friction drive surface for supporting the cylindrical members.

4,010,440

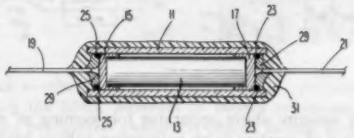
ELECTRICAL RESISTOR COMPONENT ASSEMBLY WHICH IS HERMETICALLY SEALED

Charles L. Wellard, Cape May Court House, N.J., assignor to American Components Inc., Conshohocken, Pa.

Filed Feb. 10, 1975, Ser. No. 548,668

Int. Cl.² H01C *1/02*

U.S. Cl. 338—237 **8 Claims**



1. An hermetically sealed electrical resistor component assembly comprising in combination: A sleeve shaped member having first and second open ends and being fabricated from high-density, non-porous and non-hydroscopic material, said sleeve shaped member having an inside surface; an electrical resistor component including first and second end caps and first and second conducting wires respectively connected thereto, said electrical resistor component formed and disposed to have its first and second end caps fitting tightly against said inside surface of and within said sleeve shaped member with said first and second conducting wires respectively extending from said first and second open ends; and first and second solder means formed to respectively cling to said first and second end caps, to said inside surface of said sleeve shaped member and to said first and second conducting wires to thereby close, in sealed form, said first and second open ends of said sleeve shaped member with said electrical resistor component therebetween and further formed to permit said first and second conducting wires to respectively pass therethrough but in sealed contact therewith to protrude beyond the ends of said sleeve shaped member.

4,010,441

FLEXION-PLATE HYDROPHONES

Jeanne-Marie Monique Richard, Sanary-sur-Mer, France, assignor to Etat Francais, France

Filed Mar. 5, 1975, Ser. No. 555,592

Claims priority, application France, Mar. 5, 1974, 74.07351

Int. Cl.² H04B *13/00*

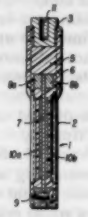
U.S. Cl. 340—10 **10 Claims**

1. A bidirectional flexion-plate hydrophone comprising:

only a single flexible cicular membrane of substantially constant thickness,

two rigid rings enclosing the periphery of said membrane,

a piezoelectric disc on at least one face of said membrane, the exterior diameter of which is smaller than the interior diameter of said rigid rings wherein said membrane, said rings and said discs being completely embedded in an



elastomeric material forming a unit attached to a rigid support only through said elastomeric material.

4,010,442

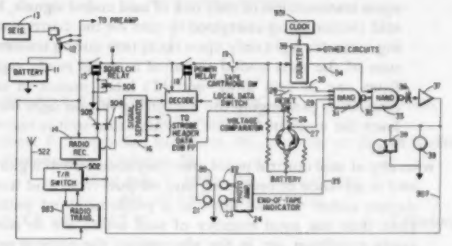
STATUS DISPLAY FOR SEISMOMETER-GROUP RECORDER OPERATIONS

Robert A. Broding, Tulsa, Okla., assignor to Standard Oil Company, Tulsa, Okla.

Filed Apr. 25, 1975, Ser. No. 572,493

Int. Cl.² G01V *1/22*; H04B *7/14*

U.S. Cl. 340—15.5 TS **1 Claim**



1. In apparatus for seismic geophysical surveying comprising means for generating seismic waves in the earth at one source location within a survey area that includes a plurality of spaced source locations, a plurality of transducer means distributed over said area for receiving said seismic waves after travel through the earth from each of said source locations to each of a plurality of receiving locations spaced from each other within said area, a plurality of recorder units each being connected to the output of at least one of said receiving transducer means and adapted to reproducibly record the output from those transducer means connected to it, all of said units being in a standby status to receive only communications until energized by connection to a supply of electrical power to record a trace, each said unit being positioned in said area near the receiving location occupied by said connected receiving-transducer means, each of said recorder units including means responsive to one of a set of coded signals transmitted over a communications link from a control point, to connect said recorder unit to a supply of electrical power, means for recording a fist sequence of signals representing record-identification and recording parameter data, and means for recording a second sequence of signals representing wave-amplitudes characterizing the seismic waves arriving at said connected receiving-transducer means, said apparatus including also means at said control point for transmitting at a frequency f_1, a set of coded signals to energize only those of said recorder units forming a recording array having a desired relationship to said one source location, to record the plurality of traces forming one multitrace seismic record, the improvement comprising

automatic means in each of said units interconnected with

the recording system thereof for producing a status signal only where

a. at least one of said transducer means is operatively connected to said unit,

b. a cartridge containing a reproducible recording medium is inserted into said unit,

c. said medium is not exhausted, and

d. said supply of electric power has at least a predetermined voltage,

a transmitter in each of said units transmitting at a frequency f_2 differing from f_1,

automatic means in each of said units responsive to said status signal for energizing said transmitter to form a communications path to said control point and to transmit over said path a status ready signal,

receiving means at said control point responsive to said path to receive each said status ready signal from each said unit energized, and

automatic means at said control point connected to said control-point receiving means and responsive separately to each transmitted status ready signal to produce a separate visual indication of each of said status ready signals received,

a. said means to produce said separate visual indication including a plurality of indicator lights mounted on a panel at said control point in a pattern at least approximately similar to the location pattern of a plurality of said units, and

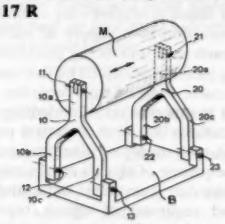
b. said status ready signal responsive means including (1) a separate circuit for each indicator light activated upon transmission of only one of said coded signals, but said circuit being energized to turn on the corresponding indicator light only upon reception during transmission of the next coded signal of a status ready signal from one of said units, and (2) latch means in said circuit for prolonging the energizing of said light for at least the majority of time in which said unit is recording,

whereby at said control point, one may ascertain at a glance and in advance of recording said outputs from said transducers either that all units in a predetermined pattern (less than the total number of said units) are in status ready condition, or, in the alternative, the pattern position of any of said units that are not ready.

4,010,443
VELOCITY PICKUPS OF THE HORIZONTAL SEISMOMETER TYPE

Jean-Baptiste Lacorre, Carquefou, France, assignor to Societe d'Etudes, Recherches et Constructions Electroniques Sercel, Carquefou, France

Filed Nov. 25, 1974, Ser. No. 526,880
Int. Cl.² G01V 1/16; H04R 23/00
U.S. Cl. 340—17 R **3 Claims**



1. A seismic pickup comprising:

a. a base,

b. two rigid beams pivotally mounted on said base, the pivot axes of said beams being parallel and said beams being spaced apart in a direction perpendicular to the pivot axes,

c. a mass spaced above said base and mounted between said beams, said mass being connected to each beam by a pivot,

d. said base, beams, and mass defining a parallelogram articulated at all four of its corners,

e. each beam being articulated to said base on two spaced apart pivots located on a single pivot axis, and

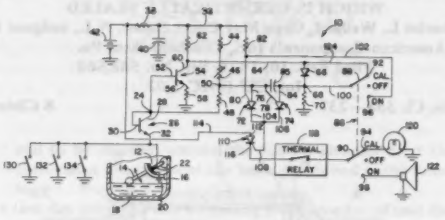
f. at least one of said pivots being an elastic pivot which constantly urges said beams and mass to a particular position with respect to said base,

g. said mass having a resonant frequency below one cycle per second.

4,010,444
AUTOMOTIVE BURGLAR ALARM WITH GAS SIPHONING DETECTOR

Aroon C. Shah, 15 Spruce St., Waltham, Mass. 02154

Filed Mar. 29, 1976, Ser. No. 671,320
Int. Cl.² B60R 25/10
U.S. Cl. 340—63 **2 Claims**



1. A security alarm apparatus for warning of attempted siphoning of gasoline in an automotive vehicle having a battery, an electrically energizeable sonic alarm, and a first variable resistor whose resistance is varied by a gas tank float, said apparatus comprising: a window comparator means having first and second input terminals and an output terminal, a resistive voltage divider means including said first resistor and a second manually adjustable resistor; means for connecting said voltage divider means across said battery; said voltage divider means having output signal means coupled without inversion to the first terminal of said window comparator means to form a first signal at said first input terminal, an inverting amplifier means fed by said output signal means of said voltage divider means and feeding the second input terminal of said window comparator means to form a second signal at said second input terminal; said second resistor being variable to initially set said alarm apparatus in a manner that said first and second signals are substantially equal, said window comparator means being configured in a manner that said output terminal has a predetermined output signal state in response to the absolute value of the difference between said first and second signals being greater than a predetermined constant, and means responsive to the output of said window comparator means for coupling said sonic alarm across said battery in response to said predetermined state.

4,010,445
WORD RECOGNITION APPARATUS

Yukio Hoshino, Tokyo, Japan, assignor to Nippon Electric Company, Ltd., Tokyo, Japan

Filed Sept. 19, 1975, Ser. No. 614,984
Claims priority, application Japan, Sept. 25, 1974, 49-110295
Int. Cl.² G06K 9/00
U.S. Cl. 340—146.3 WD **4 Claims**

1. A word recognition apparatus for use with a character recognition system, comprising:

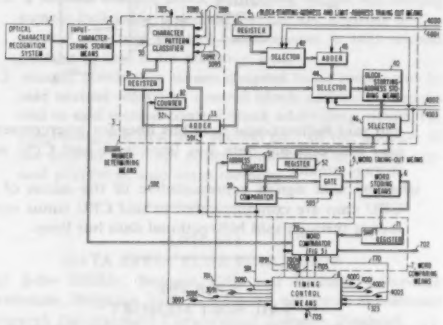
a. word storing means for storing a plurality of words to be retrieved in block units in the order of block numbers so that characters placed in one or more given positions of a

word forming an input character string are used as a retrieving key corresponding to one of said block numbers;

b. block-starting-address storing means for storing starting addresses of the block units in said word storing means;

c. block-starting-address and limit-address taking-out means for taking out a block starting address and a block limit address corresponding to a block number next to the designated block number from the block-starting-address storing means;

d. input-character-string storing means for storing the input character string recognized by said character recognition system;



e. block-number determining means for sequentially designating the block numbers of blocks containing words having recognized characters placed in said given positions of said input character string;

f. word taking-out means for sequentially taking out words stored in the addresses from the block starting address of said word storing means to an address short of said block limit address by using the starting address and the block limit address which are taken out from the block-starting-address storing means with a block number used as the retrieving key; and

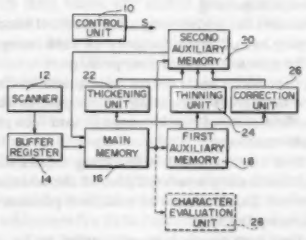
g. word comparing means for detecting a word similar to the input character string to a degree over a given value by the comparison of the words thus taken out with said input character string.

4,010,446

CHARACTER PATTERN LINE THICKNESS REGULARIZING DEVICE

Ryuichi Kawa, Tokyo, Japan, assignor to Kabushiki Kaisha Ricoh, Tokyo, Japan

Filed June 27, 1974, Ser. No. 483,740
Claims priority, application Japan, July 2, 1973, 48-74649
Int. Cl.² G06K 9/12
U.S. Cl. 340—146.3 H **16 Claims**



1. In a character recognition system in which a document on which a character is printed is scanned and a character pattern representing the scanned document is obtained in the form of electrical signals arranged in a matrix of rows and columns constituting a quantized representation of the scanned document, the system being operative to compare the character pattern with at least one known character pattern to determine the degree of correspondence therewith, a line thickness regularizing device, comprising:

thickening means operative to sense the electrical signals representing the character pattern and thicken the line thickness of a portion of the character having a line thickness less than a predetermined value to the predetermined value by modifying the electrical signals;

thinning means operative to sense the electrical signals representing the charactter pattern and uniformly thin the line thickness of the character by modifying the electrical signals;

control means operative to control said thickening and thinning means so that the electrical signals are sequentially operated upon by the thickening means, the thinning means and again by the thickening means; and

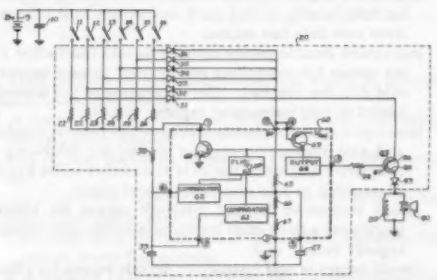
correction means arranged to operate on the electrical signals before operation thereon by said thinning means, said correction means being operative to thicken the line thickness of a portion of the character so that the line continuity of the character will be maintained while the electrical signals are operated upon by the thinning means.

4,010,447

SIGNAL TRANSMITTER USING AN ACTIVE THICK FILM SUBSTRATE

Robert R. Podowski, Elmhurst, Ill., assignor to Zenith Radio Corporation, Chicago, Ill.

Filed Jan. 7, 1976, Ser. No. 647,291
Int. Cl.² H04Q 9/14, 9/10
U.S. Cl. 340—167 R **5 Claims**



1. A portable transmitter for selectively generating different frequency signals to control corresponding functions in a television receiver comprising:

a battery;

a plurality of resistors;

a corresponding plurality of switches connected between said battery and said resistors;

a pulse producing circuit;

a timing capacitor coupled to said pulse producing circuit for varying the frequency thereof in cooperation with said resistors and switches;

an output circuit including a transducer for developing acoustic signals corresponding in frequency to the pulses developed by said pulse producing circuit; and

a plurality of diodes arranged to electrically connect said battery to said pulse producing circuit and to said output circuit responsive to closure of any of said switches.

4,010,448

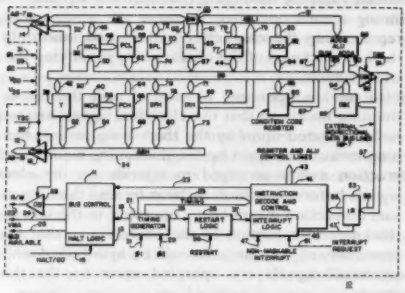
INTERRUPT CIRCUITRY FOR MICROPROCESSOR CHIP

Thomas H. Bennett; Earl F. Carlow, both of Scottsdale; Anthony E. Kouvoussis, Phoenix, all of Ariz.; Rodney H. Orgill, Norristown, Pa., and Michael F. Wiles, Phoenix, Ariz., assignors to Motorola, Inc., Chicago, Ill.

Filed Oct. 30, 1974, Ser. No. 519,140

Int. Cl.² G06F *9/18*

U.S. Cl. 340—172.5 **5 Claims**



1. In a microprocessor, circuitry for effecting execution of an interrupt operation of said microprocessor in response to a interrupt request signal comprising:

data bus means for transferring digital information, said data bus means being capable of being coupled to a memory means having an interrupt routine program stored therein;

register stroage means coupled to said data bus means for temporarily storing digital information in accordance with execution of various instructions by said microprocessor, including an instruction for setting an interrupt mask bit;

an interrupt request conductor for conducting said interrupt request signal;

instruction register means coupled to said data bus means for temporarily storing each instruction as it is received from said data bus means;

instruction decode means coupled to said instruction register means for controlling said register storage means and said data bus means to effect execution of the instruction stored in said instruction register means;

interrupt means coupled to said interrupt request conductor and said instruction register means for inhibiting said temporary storing of the next instruction to be executed in response to said interrupt request signal;

means responsive to said interrupt means for internally generating a fixed code instruction within said instruction register means; and

circuit means in said instruction decode means for effecting transferring digital information in said register stroage means to said memory means and causing said microprocessor to branch to said interrupt routine program.

4,010,449

MOS COMPUTER EMPLOYING A PLURALITY OF SEPARATE CHIPS

Federico Faggin, Cupertino; Masatoshi Shima, Santa Clara, both of Calif., and Stanley Mazor, Brussels, Belgium, assignors to Intel Corporation, Santa Clara, Calif.

Filed Dec. 31, 1974, Ser. No. 537,648

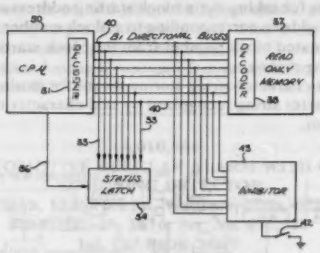
Int. Cl.² G06F *13/00*

U.S. Cl. 340—172.5 **3 Claims**

1. In an MOS computer employing a plurality of separate chips including a separate central processing unit chip (CPU chip) and a plurality of bidirectional data bus lines coupled to said CPU chip and one or more of said plurality of separate chips, the improvement comprising:

a CPU status storage means for storing signals representative of the status of said CPU chip; and

a plurality of lines coupled to said CPU status storage means



and said bidirectional data bus lines for interconnecting said bidirectional data bus lines with said CPU status storage means:

whereby said signals representative of the status of said CPU chip are communicated to said CPU status storage means through said bidirectional data bus lines.

4,010,450

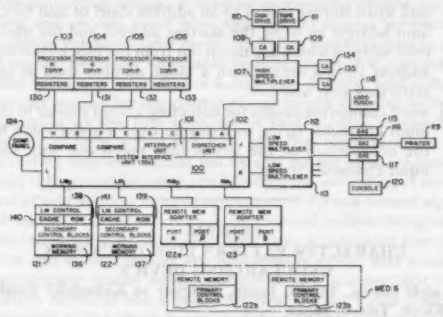
FAIL SOFT MEMORY

Marion G. Porter, Phoenix; Garvin Wesley Patterson, and Jaime Calle, both of Glendale, all of Ariz., assignors to Honeywell Information Systems, Inc., Waltham, Mass.

Filed Mar. 26, 1975, Ser. No. 562,361

Int. Cl.² G06F *11/04, 13/06, 9/16*

U.S. Cl. 340—172.5 **15 Claims**



1. A fail soft mechanism in a general purpose computer system having at least one processor, said fail soft mechanism for automatically providing an alternate addressing path for addressing data in a second portion of main memory when a failure is detected in a first portion of main memory, said mechanism comprising:

a. first means for addressing a first control block means in a first portion of main memory of said computer system, said first means further comprising:

1. a first interrupt control block addressing means for storing signals indicating a first part of the address of the first control block means in said first portion of said main memory;

2. a first control block addressing means for storing signals indicating a second part of the address of said first control block means in said first portion of said main memory; and,

3. a first combining means coupled to be responsive to said first interrupt control block addressing means and to said first control block addressing means for combin-

ing the first part and second part of the address of said first control block means;

b. second means coupled to be responsive to said first means, for detecting a failure in the first portion of main memory addressed by said first means; and,

c. third means, coupled to be responsive to said second means, for automatically providing an alternate path to a second portion of main memory upon detection of a failure in said first portion of main memory, said third means further comprising;

1. a second interrupt control block addressing means for storing signals indicating a first part of the address of a second interrupt control block means in said second portion of said main memory;

2. a second control block addressing means for storing signals indicating a second part of the address of the second interrupt control block means in said second portion of said main memory; and,

3. second combining means coupled to be responsive to said second interrupt control block addressing means and to said second control block addressing means, for combining the first and second part of the address of the second interrupt control block means in said second portion of said main memory.

4,010,451
DATA STRUCTURE PROCESSOR

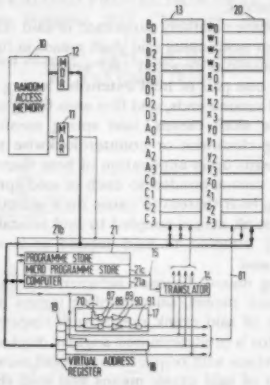
David John Kibble, Burgess Hill, and Richard Lawrence Grimsdale, Brighton, both of England, assignors to National Research Development Corporation, London, England

Continuation of Ser. No. 401,612, Sept. 28, 1973. This application July 24, 1975, Ser. No. 598,877

Claims priority, application United Kingdom, Oct. 3, 1972, 45494/72

Int. Cl.² G06F 9/20, 9/10

U.S. Cl. 340—172.5 9 Claims



1. Apparatus for use in carrying out data processing operations in which data items are called from storage by an address, the apparatus including a primary store for storing items of data at a plurality of storage locations, the primary store having an address input and each location having a unique real address which when applied to the said address input in the form of a real address allows transfer of data items to and from that location of the primary store, a main store having a greater number of storage locations than the primary store, means for allowing transfer of stored items between the primary and main stores, an address translator, having its output coupled to the address input of the primary store, for translating into real addresses for data items from virtual addresses for said items to allow programs of data processing operations which use virtual addresses to be used, and a program storage means for storing said programs which use virtual addresses, each real address being changeably associated with a virtual address particular thereto, changes in the associations between real and virtual addresses effecting changes in the said programs, and the translator including translator storage means, separate from the primary and main stores, for storing addresses, and conversion means for changing the associations between real and virtual addresses independently of transfer of data items between the main and primary stores, said conversion means including logic means for changing said associations while real addresses of data items remain the same by operating upon addresses already held by the translator storage means, the said changes in associations being carried out by the conversion means in response to instruction signals applied to the conversion means.

4,010,452
ASSOCIATIVE DATA PROCESSING APPARATUS AND METHOD

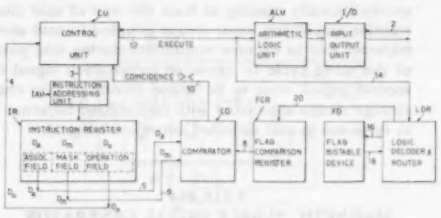
Jean Cazanove, Barentin, France, assignor to Burroughs Corporation, Detroit, Mich.

Filed Sept. 16, 1975, Ser. No. 613,906

Claims priority, application France, Oct. 15, 1974, 74.34590

Int. Cl.² G06F 9/00

U.S. Cl. 340—172.5 23 Claims



1. Data processing apparatus having the ability to process by association, comprising:

A. a control unit for receiving instructions and controlling the execution thereof;

B. flag register means for registering one or more flag criteria;

C. an instruction register for storing a series of multi-bit instruction words each including:

i. an association field of one or more bits designating the one or more flag criteria;

ii. a masking field of one or more bits for designating the flag criteria to be honored by unmasking the respective association-field bit;

iii. and an operation field of a plurality of bits for designating a particular data processing operation;

D. an instruction register addressing means responsive to the control unit for addressing the instruction register to read out the instruction words therefrom;

E. flag comparator means connected to the control unit for comparing the flag criteria registered in the flag register means with the unmasked association-field bits of each instruction word read out of the instruction register; and

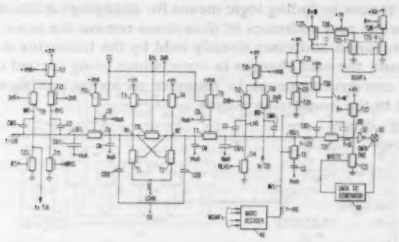
F. instruction execution means controlled by the control unit to execute the operation designated in the instruction word upon the finding by the comparator means of a match between the unmasked association-field bits of the instruction word and the flag criteria registered in the flag register means.

4,010,453

STORED CHARGE DIFFERENTIAL SENSE AMPLIFIER

Scott Clarence Lewis, Essex Junction, Vt., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 3, 1975, Ser. No. 637,440
Int. Cl.² G11C *11/40*
U.S. Cl. 340—173 R **20 Claims**



8. In the memory system including first and second groups of charge storage means, each group being associated, respectively, with first and second bit/sense lines, the improvement comprising:

an information signal source;

a differential sense amplifier coupled to said bit/sense lines, said sense amplifier including a pair of charge transfer amplifying input means;

decoding means for coupling a decoded information signal corresponding to a first logical state to said first bit/sense line during at least a portion of a write cycle; and

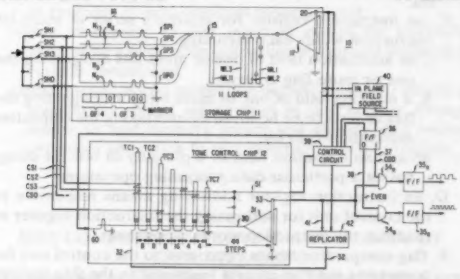
write bias means coupled to said second bit/sense line for unconditionally causing at least the one of said charge transfer amplifying input means coupled to said second bit/sense line to become conductive during said portion of the write cycle to cause an information signal of a second logical state to be stored in one of said charge storage means associated with said second bit/sense line in response to said decoded information signal.

4,010,454

MAGNETIC BUBBLE SIGNAL GENERATOR

Andrew Henry Bobeck, Chatham, and Irynej Danylchuk, Morris Plains, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 30, 1974, Ser. No. 474,703
Int. Cl.² G11C *11/14*; H04M *1/46*
U.S. Cl. 340—174 TF **19 Claims**



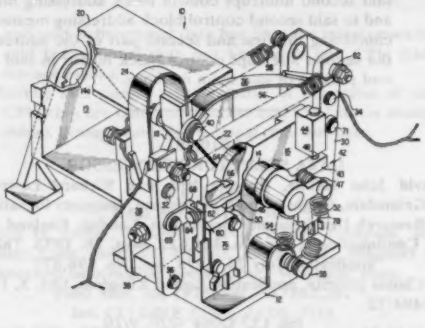
1. Magnetic apparatus comprising a layer of material in which single wall domains can be moved, means for defining in said layer $n > 3$ multistage loops for recirculating domains thereabout periodically through first positions therein response to a magnetic field varying cyclically at frequency f_1, said loops being organized into $m < n$ groups of loops, means responsive to a first signal for selectively providing a domain in a coded loop of each of said m groups of loops, accessing means for said loops, said accessing means comprising a multistage channel including a domain detector, said channel being operative responsive to said field for moving domains to said detector, said accessing means also including a plurality of spaced-apart first stages therein each associated with one of said first positions and spaced-apart coded numbers of stages from said detector, said n loops including n different numbers of stages.

4,010,455

CYCLICAL BI-DIRECTIONAL ROTARY ACTUATOR

William C. Stange, Ellicott City, Md., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed July 17, 1975, Ser. No. 596,787
Int. Cl.² G08B *1/08*
U.S. Cl. 340—224 **25 Claims**



1. A thermally powered actuator comprising:

a. frame means;

b. shaft means rotatably supported in said frame means;

c. means for positioning said shaft means in first and second rotary positions disposed 180° apart;

d. at least one pair of heat extensible spring means having first and second ends, said first ends being coupled to said rotatable shaft means, said spring means respectively applying clockwise or counterclockwise torque to said shaft means upon application of heat thereto;

e. heating means bonded to each of said spring means for applying heat thereto to cause their selective extension;

f. spring crank means coupled to said rotatable means and pivotally coupled to said second ends of said spring means; and

g. coupling means disposed between said shaft means and said crank means, said coupling means permitting free rotation of said crank means with respect to said shaft means for a predetermined angular displacement of said crank means with respect to said shaft means and unitary rotation of said crank means and said shaft means for angular rotations of said crank means with respect to said shaft means which are greater than said predetermined angular displacement.

4,010,456

LOW BATTERY VOLTAGE INDICATOR FOR A PORTABLE DIGITAL ELECTRONIC INSTRUMENT

Ernst R. Erni, Portola Valley, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Mar. 10, 1975, Ser. No. 556,753
Int. Cl.² G09F *9/32*
U.S. Cl. 340—248 B **1 Claim**

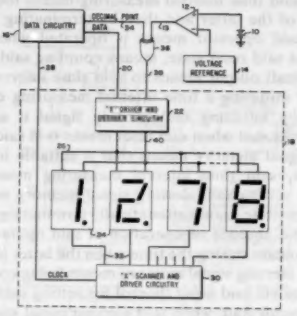
1. A digital electronic instrument comprising:

a battery;

digital circuit means responsive to an input stimulus, said digital circuit means having a digital output;

a digital display including a plurality of display modules responsive to the output of the digital circuit means, each display module having a plurality of light emitting segments for selectively displaying numerals and a decimal point, said decimal point being normally displayed in combination with a numeral on the same display module of the digital display;

a reference voltage supply; and

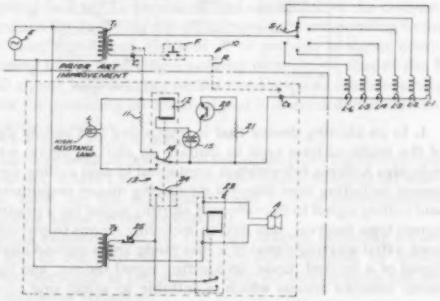


a comparator having a first input connected to the reference voltage supply, a second input connected to the battery, and an output for giving an output signal when the battery voltage is below the reference voltage, the output being connected to the digital display circuit means for causing the true decimal point to be extinguished and a plurality of the adjacent decimal points to be illuminated in response to an output signal from the comparator.

4,010,457
OVERLOAD PROTECTION DEVICE

Bobby Rollene Simpson, 915 Chippewa, Anaheim, Calif. 92801

Filed Mar. 17, 1975, Ser. No. 559,162
Int. Cl.² G08B *21/00*
U.S. Cl. 340—253 A **8 Claims**



1. A circuit protection device for a circuit that includes a plurality of loads alternatively selectable and connectable to a lead of said circuit comprising:

a selector switch in one of said leads for selectively and alternatively connecting said loads into said circuit and opening said circuit to effect change of the load connected therein;

sensing means connected in one of said leads of said circuit for sensing the current drawn therethrough and developing an electrical potential indicative thereof;

relay means connected in parallel across said sensing means and conductive when said electrical potential thereacross exceeds a predetermined amplitude;

a high resistance likewise connected in parallel with said sensing means;

a first switch having first and second contacts disposed with said first contact in series with said sensing means and said second contact in series with said high resistance, whereby said first switch is operable under the control of said relay means to break the circuit through said sensing means while said relay means is rendered conductive during which condition said first switch establishes a circuit path through said high resistance and said second contact;

an alarm circuit having an alarm mechanism and having a second switch disposed therein for dependent operation with said first switch under the control of said relay means whereby said second switch is opened when said first switch conducts through said sensing means and is closed when said first switch conducts through said high resistance;

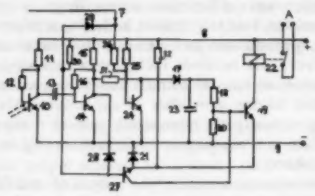
latching means associated with said second switch for latching said second switch into a conductive mode upon closure of said second switch to maintain said alarm circuit in a conductive state; and

reset means for manually resetting said latching means.

4,010,458
LIGHT GATE SYSTEM

Markus Köpfli, Wil, Switzerland, assignor to Cerberus AG, Mannedorf, Switzerland

Filed July 10, 1975, Ser. No. 594,880
Claims priority, application Switzerland, July 15, 1974, 9742/74
Int. Cl.² G08B *13/18*
U.S. Cl. 340—258 R **9 Claims**



1. Light gate system having a radiation transmitter (**2**), a radiation receiver (**3, 10**), an output stage (**19**), and an evaluation circuit (**4, 5**) comprising

a pulse source (**1**) connected to and controlling the radiation transmitter (**2**) to emit a radiation pulse in the time interval during persistence of a control pulse from the source (**2**); and wherein the evaluation circuit (**4, 5**) comprises circuit means (**13, 14, 17, 18, 20**) connecting the radiation receiver (**3, 10**) to said output stage (**19**), controlling said output stage to assume a first state upon presence of radiation pulses detected by the radiation receiver (**3, 10**) and an alarm state upon absence of detection of radiation pulses, said circuit means including a controllable switch (**24**) connected across the input of the output stage (**19**) and controlled by the pulse source (**1**) to block transmission of pulses from the radiation receiver (**3, 10**) to the output stage (**19**) during the gaps between control pulses from the pulse source (**1**); and

a phasing supervision stage (**27**) connected to the output stage (**19**) and connected to and controlled by the pulse source (**1**), the phasing supervision stage being open during pulse gaps between control pulses from the pulse source (**1**) and permitting application of radiation pulses received from the radiation receiver (**10**) during said gaps to the output stage (**19**) to control the output stage to assume the alarm state so that the output stage (**19**) will logically provide an alarm output signal

a. upon failure of the radiation receiver (**3, 10**) to detect a

radiation pulse when the control pulse coupled from the pulse source (1) is present, or

b. upon detection by the radiation receiver (3, 10) of radiation when the control pulse coupled from the pulse source (1) is absent.

4,010,459

SYSTEMS FOR THE DETECTION OF MOVING OBJECTS WITHIN A SURVEY AREA BY MICROWAVE DIFFRACTION

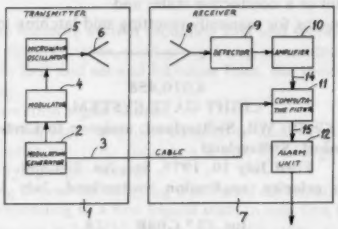
Jorgen Pontoppidan; Erik Tue Sorensen, both of Lyngby, and Erik Kjaer Nielsen, Ballerup, all of Denmark, assignors to Børge Schløger; Oluf Tvede-Jensen; Erik Landert; Hans Børge Hansen and Niels Ove Wrist, all of, Denmark

Filed Nov. 5, 1975, Ser. No. 628,973

Claims priority, application Denmark, Nov. 7, 1974, 5815/74

Int. Cl.² G08B 13/24

U.S. Cl. 340—258 A **6 Claims**



1. A system for detecting moving objects within a survey area by microwave diffraction, comprising:

a transmitter, said transmitter including a microwave oscillator, a modulator and a transmitting antenna;

a receiver, said receiver including a receiving antenna, a detector, an amplifier and a commutative filter;

said filter having a number of capacitors, said capacitors being successively connected, one at a time, into said receiver in a continuous cycle and serving as filter shunt capacitors;

alarm means connected to the output of said filter; and,

a modulation generator coupled to both said receiver and said transmitter for providing synchronized control signals to both said modulator and said commutative filter.

4,010,460

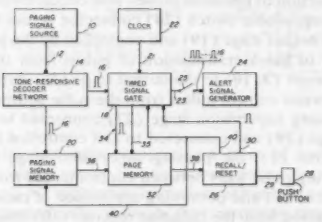
ALERTING SYSTEM WITH MEMORY

James DeRosa, Westford, Mass., assignor to Bell & Howell Company, Chicago, Ill.

Filed Dec. 12, 1974, Ser. No. 532,059

Int. Cl.² H04M 11/02

U.S. Cl. 340—311 **14 Claims**



1. In an alerting device that is responsive to a calling signal to initiate an alerting signal and having reset means to terminate the alerting signal, means including time interval measuring means responsive to said calling signal to initiate said alerting signal, said time interval measuring means including means automatically to terminate said alerting signal after a prescribed time interval, said reset means having alternatively a normal reset state and a recall state into which said reset means can be set, an input for setting said reset means alternatively into said reset state or said recall state, said reset means having operator means, a reset output means and recall output means, means coupling said reset means via said reset output means to said time interval measuring means for terminating operation of the latter and thereby terminating said alerting signal if said operator means is operated when said reset means is in said reset state, means coupling said reset means via said recall output means to said time interval measuring means for initiating a time interval measuring cycle thereof and thereby initiating said alerting signal if said operator means is operated when said reset means is in said recall state, alerting signal memory means that is settable into a stored-page state, said time interval measuring means including means for setting said alerting signal memory means in said stored-page-state upon automatically terminating said alerting signal in the absence of operation of said operator means of said reset means during the time when the latter is in said reset state, said alerting signal memory means being coupled to said reset means via said input thereof for setting said reset means into said recall state when said alerting signal memory means is set into said stored-paged state.

4,010,461

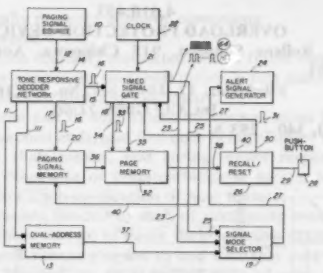
ALERTING SYSTEM WITH DUAL-ADDRESS MEMORY

Thomas Raymond Stodolski, Cambridge, Mass., assignor to Bell & Howell Company, Chicago, Ill.

Filed Jan. 17, 1975, Ser. No. 541,873

Int. Cl.² H04M 11/02

U.S. Cl. 340—311 **17 Claims**

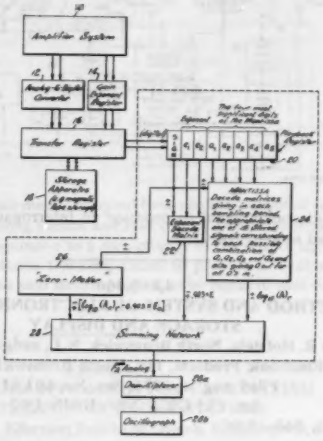


1. In an alerting device that is responsive to a calling signal of the multi-address type to initiate an alerting signal which indicates address information contained in said calling signal, means including time interval measuring means responsive to said calling signal to provide said alerting signal for a predetermined time interval, said device including means to provide at least a first alerting signal of a first mode and a second alerting signal of a second mode, an alerting signal output, and signal mode selector means which is settable to select one of said modes for application to said alerting signal output, means to sense an address indicator in a calling signal and to provide an address-responsive output signal, address-responsive means to receive said address-responsive output signal and correspondingly to set said signal mode selector means to select said one of said modes, said time interval measuring means including means automatically to terminate said alerting signal after said predetermined time interval, alerting signal memory means, said time interval measuring means including means for setting said alerting signal memory means in a stored-page state upon automatically terminating said alerting signal, and recall means to institute operation of said device while said alerting signal memory means is in said stored-page state for again initiating said alerting signal in said selected mode.

4,010,462
SEISMIC PLAYBACK SYSTEM

Fontaine C. Armistead, Darien, Conn., assignor to Texaco Development Corporation, New York, N.Y.

Continuation of Ser. No. 153,078, June 14, 1971. This application Oct. 29, 1973, Ser. No. 410,735
Int. Cl.² H03K *13/04*
U.S. Cl. 340—347 DA **4 Claims**



1. A seismic playback system adapted to receive wide dynamic range seismic signals, comprising means for receiving at least one seismic analog signal; means for converting at least one received seismic signal to digital signals representing the general algebraic equation:

$$Q_t = \pm AG^{-E}$$

where Q_t represents the amplitude, either positive or negative, of the received seismic signal; A represents a mantissa, G represents a radix, E represents an exponent, and where some of the digital signals represent the four most significant digits of A and some represent E; first means connected to the converting means for decoding the digital signals representative of E to provide an analog signal of one polarity corresponding to E log G, second means connected to the converting means for decoding the digital signals corresponding to the four most significant digits of A to provide a signal corresponding to log A having a polarity opposite to that of the E log G signal; zero-making means connected to the converting means for providing an analog signal Z in accordance with the following equation:

$$Z = \pm\{\log_{10}(Ao)_r - 0.903E_o\}$$

and having the same polarity as the signal from the first decoding means, where $(Ao)_r$ is a predetermined rounded off minimum value for the mantissa A and E_o is a predetermined maximum value of the exponent E,

means connected to the first and second decoding means and to the zero-making means for providing an analog output signal in accordance with the three signals and the following equation:

$$\log Q_t = \log A - E \log G - Z.$$

4,010,463
PHASE LOCKED LOOP RESOLVER TO DIGITAL CONVERTER

Robert M. Kay, Seminole, Fla., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Apr. 21, 1975, Ser. No. 570,065
Int. Cl.² H03K *13/02*
U.S. Cl. 340—347 SY **1 Claim**

1. A resolver to digital converter comprising:

a. a counter for frequency dividing an input signal;

b. logic means for generating a predetermined rectangular waveform;

c. a phase splitter fed by the logic means and having a pair of otrhogonal outputs;

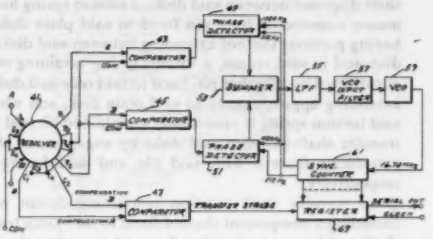
d. a pair of operational amplifiers fed by the orthogonal outputs of the phase splitter;

e. first and second matched amplitude detectors, each fed by one of the pair of operational amplifiers;

f. first and second integrating comparators fed one each by the first and second matched amplitude detectors and fed back respectively to the first and second operational amplifiers;

g. a resolver including compensation windings fed by each of the operational amplifiers;

h. first and second zero crossing differential comparators fed by the orthogonal outputs of the resolver;



i. first and second phase detectors fed by first and second zero crossing differential comparators;

j. a summer fed by the first and second phase detectors producing error signals;

k. a voltage controlled oscillator fed by the summer;

l. a synchronous digital counter fed by the voltage controlled oscillator and fed back to the first and second phase detectors for reference signals forming a second order phase locked loop;

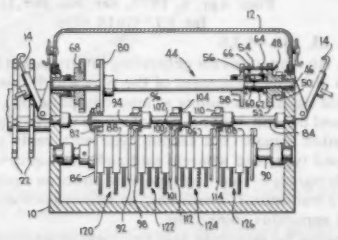
m. a serial output register fed by the synchronous digital counter; and

n. a third zero crossing differential comparator interposed between the compensation windings of the resolver and the serial output register for a strobe pulse whereby the count in said synchronous digital counter when strobed is a digital representation of the analog input.

4,010,464
MAGNETICALLY OPERATED REED SWITCH TYPE DIGITAL ENCODER

Harold O. Wires, Picayune, Miss., and Samuel E. Rickly, Slidell, La., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Oct. 21, 1975, Ser. No. 624,358
Int. Cl.² H03K *13/02*; B60K *41/24*; F16D *67/02*
U.S. Cl. 340—347 P **2 Claims**



1. A shaft position digitizer comprising:

a rotatable input shaft,

magnetically operated reed switch means for providing an electrical digit output representative of rotation of said input shaft,

magnet means movable to operate said reed switch means,

means for moving said magnet means which dispose said magnet means in arrangements which are indicative of said input shaft rotation,

jump transfer means having lost motion means for producing a jump advance of said magnet moving means in response to a predetermined rotation of said input shaft whereby least significant digit ambiguity in said digital output is eliminated, said jump transfer means including a rotatable jump transfer shaft, a plain disk rotatable on said jump transfer shaft by rotation of said input shaft, a further disk fixed to said jump transfer shaft and having a recess therein, a torsion spring having as parts thereof spaced extensions and coiled about said jump transfer shaft disposed between said disks, a torsion spring loading means constituted by a pin fixed to said plain disk and having portions thereof extending between said disks and disposed in said recess, a torsion spring retaining means constituted by a further pin fixed to said recessed disk and extending approximately to said plain disk, and wherein said torsion spring is operatively maintained on said jump transfer shaft between said disks by engagement of said extensions thereof with said pin and said further pin respectively,

a jump transfer shaft rotation restraining detent means including a component thereof fixed to said jump transfer shaft and having a plurality of spaced camming elements, and a separately supported plunger means normally biased against said component at between said camming elements so as to resist rotational displacement of said component and of said jump transfer shaft,

wherefore said jump advance is produced in response to a rotation of said input shaft and said plain disk therewith which moves said extended portion of said pin to engage said recess and thereby drive said recessed disk together with said jump transfer shaft and said component fixed thereto so as to temporarily interpose a said camming element of said component at said plunger which negates said plunger bias restraint and frees said component for rotation together with said jump transfer shaft and said recessed disk by energy of said torsion spring stored therein prior to a release thereof following displacement of said further pin by said drive to said recessed disk.

4,010,465

CHANNEL ENCODING FOR DISTANCE MEASUREMENT EQUIPMENT

Sven H. Dodington, Mountain Lakes, and Jesse S. LeGrand, Clifton, both of N.J., assignors to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed Apr. 4, 1975, Ser. No. 565,311

Int. Cl.² G01S *9/56*

U.S. Cl. 343—5 LS **8 Claims**

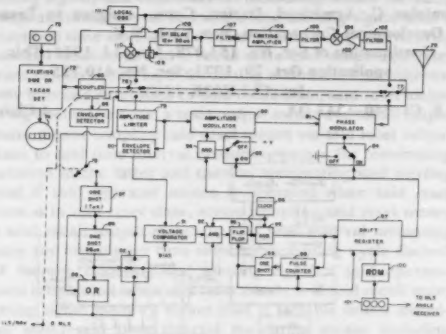
1. An Apparatus for generating interrogation signals for use with airborne equipment of the type which transmits interrogation signals containing at least one pulse of a first type to a ground beacon, said beacon of a type which responds to interrogation signals of a second type with reply signals of said second type, and wherein said airborne equipment processes reply signals of said first type, said airborne equipment including a transmitter, a receiver, an interrogator and an antenna, said apparatus comprising:

means for detecting said first type of interrogation signal;

means for converting said at least one pulse to at least one second pulse having a reduced amplitude;

means for generating a coded signal; and

means for modulating said at least one second pulse with



said coded signal to produce an interrogation signal of said second type.

4,010,466

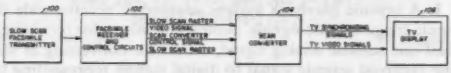
METHOD AND SYSTEM OF ELECTRONIC IMAGE STORAGE AND DISPLAY

Steven R. Hofstein, North Brunswick, N.J., assignor to Princeton Electronic Products, Inc., North Brunswick, N.J.

Filed Aug. 4, 1975, Ser. No. 601,615

Int. Cl.² G01S *7/04*; H04N *3/00*

U.S. Cl. 343—5 SC **120 Claims**



1. A method of operating a system to display an image on a raster scan TV display wherein an incoming signal comprises a sequence of scan lines whose line rate is lower than the horizontal TV line rate within a field of the TV display, the method comprising:

selecting an incoming signal line rate to be an odd integer submultiple of the horizontal TV line rate;

applying the incoming signal to a scan converter having a memory therein and storing the incoming signal in segments in the memory by writing each segment into the memory during the time required to scan one horizontal TV line of the field; and

scanning the memory and displaying the signal stored therein on the TV display by reading from the memory during the time required to scan the next horizontal TV line in the field to thereby write and read during alternate horizontal TV lines of the same field.

4,010,467

MISSILE POST-MULTIPLE-TARGET RESOLUTION GUIDANCE

Lawrence P. Slivka, Santa Monica, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 2, 1972, Ser. No. 231,430

Int. Cl.² F42B *15/02*; G01S *7/46*, *9/02*

U.S. Cl. 343—7.4 **3 Claims**

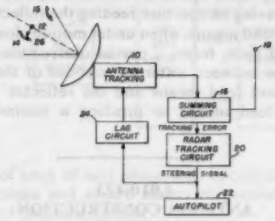
1. In an infrared tracking loop for use in the guidance system of a guided missile against multiple targets, the combination comprising:

a. an input terminal adapted to receive signals proportional to heading of the guided missile with respect to a reference plane,

b. a tracking antenna means for generating output signals proportional to the pointing direction of said antenna with respect to said reference plane,

c. a summing circuit coupled to said input terminal and to said tracking antenna for providing an output tracking error signal,

d. signal processing circuit means coupled to said summing circuit means for generating an output steering signal,



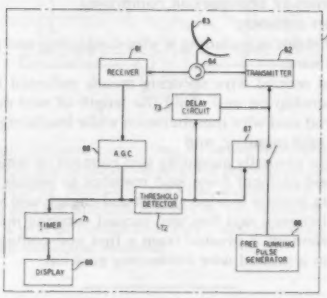
e. time lag circuit means coupled between the output of said signal processing means and said tracking antenna means and being responsive to a step change in the output signal from said antenna tracking means to provide a feedback signal to cause said steering signal to be equal to said step change.

4,010,468

METHODS AND APPARATUS FOR ELIMINATING INTERFERENCE IN RADAR SYSTEMS

William Fishbein, Elberon; Reinhard Olesch, Englishtown, and Otto Rittenbach, Neptune, all of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Oct. 10, 1975, Ser. No. 621,260
Int. Cl.² G01S 7/28, 9/02
U.S. Cl. 343—7.5 **9 Claims**



7. Apparatus for eliminating interference between radar systems operating on a common frequency, each radar system including a transmitter and a receiver coupled by a circulator to a rotatable antenna, said apparatus comprising;

means connected to said receiver for detecting an interfering pulse which exceeds a preset threshold; and

means connected to said detecting means for delaying the generation of the output pulse from said transmitter next following receipt of said interfering pulse, said delaying means including

a free-running pulse generator connected to the triggering input of said transmitter,

a normally-closed switch means interposed between said pulse generator and said transmitter and responsive to the output of said detecting means for interrupting said pulse generator upon occurrence of said interfering pulse exceeding said threshold, and

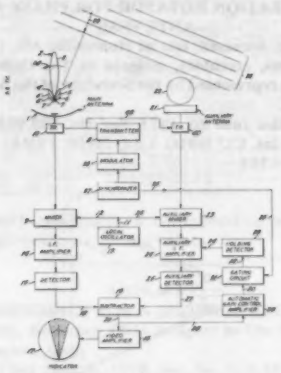
a delay circuit connected between the output of said detector and the triggering input of said transmitter.

4,010,469

INTERFERENCE SUPPRESSION

Jess I. Marcum, Santa Monica, Calif., assignor to The Rand Corporation, Santa Monica, Calif.

Filed June 20, 1951, Ser. No. 232,615
Int. Cl.² G01S 7/36; H04B 7/00
U.S. Cl. 343—18 E **4 Claims**



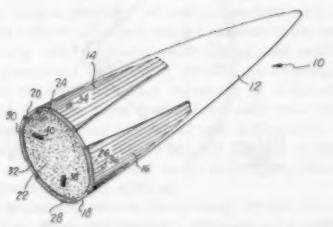
4. A system for reducing the effect of unwanted signals directed toward a receiver intended to receive reflected pulsed signals through an antenna having a radiation pattern that includes a desired main lobe and undesired additional areas, which includes; means for receiving said reflected pulsed signals; other means for receiving said unwanted signals; means for combining the outputs of both said receiving means in opposition; means periodically adjusting the output of one of said receiving means relative to the other to provide a minimum output of said combining means; and means holding constant the adjustment of said adjusting means between said periodic adjustments.

4,010,470

MULTI-FUNCTION INTEGRATED RADOME-ANTENNA SYSTEM

Howard S. Jones, Jr., Washington, D.C., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 10, 1976, Ser. No. 665,665
Int. Cl.² H01Q 1/28
U.S. Cl. 343—708 **10 Claims**



1. A radome-integrated conformal parallel plate radiator for a projectile which comprises:

a dielectric radome shape to conform to the forward portion of said projectile, said radome having a non-planar exterior wall and an interior wall substantially parallel therewith;

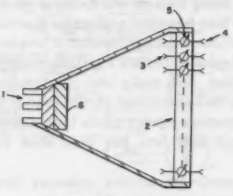
metallic ground plane means formed on said interior wall of said dielectric radome; and

wedge-shaped metallic coating means deposited on said exterior wall of said dielectric radome, said wedge-shaped metallic coating means being electrically short-circuited to said metallic ground plane means.

4,010,471
POLARIZATION ROTATOR FOR PHASE ARRAY ANTENNAS

Bob L. Smith, deceased, late of Huntsville, Ala. (Capt. Allen Bond Adams, executor), assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed June 20, 1975, Ser. No. 588,983
Int. Cl.² H01G 3/14, 19/10, 19/18
U.S. Cl. 343—754 **1 Claim**

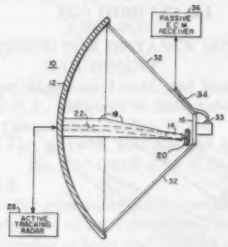


1. A system comprising feedhorn subsystem; a two dimensional array of polarization insensitive antenna elements arranged as an adjustable feed through lens; electromagnetic energy being space-fed between said subsystem and said antenna elements; polarization control means connected to said feedhorn subsystem so as to control the polarization of said energy; said polarization control means is a polarization rotator spatially located between said subsystem and said antenna elements; said feedhorn subsystem comprises a plurality of horn monopulse feeds; and said rotator being located adjacent to said plurality of feeds.

4,010,472
ANTENNA SCANNING APPARATUS

Paul H. Mountcastle, Glen Burnie, and William A. O'Berry, Severna Park, both of Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Nov. 14, 1975, Ser. No. 631,972
Int. Cl.² H01Q 3/18
U.S. Cl. 343—761 **7 Claims**



1. Antenna appartus for imparting predictable scanning motion to the antenna beam pattern, said apparatus comprising:

a. a concave parabolic reflector for r.f. energy collimation, said reflector having boresight axis and a predetermined point of focus along said axis,

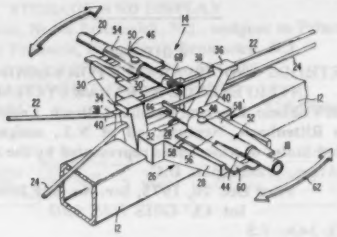
b. first feed means movably mounted relative to the reflector, said first feed means being movable along a predetermined scan path relative to the boresight axis, said first feed means having its aperture facing the reflector, and being constructed of a material which is opaque to the transmission of r.f. energy; and

c. second feed means fixedly mounted relative to the reflector and disposed along the boresight axis at a position outwardly from the first feed means, said second feed means having its aperture feeding the reflector, such that the first feed means, when under motion along said predetermined path, forms a partial obstruction masking out ray paths between different portions of the aperture of the second feed means and the reflector to cause the second feed means to produce a scanned directivity beam.

4,010,473
ANTENNA CONSTRUCTION

Franklin Roosevelt DiMeo, Woodbury, and William John Bachman, Mount Laurel, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Oct. 14, 1975, Ser. No. 622,261
Int. Cl.² H01Q 11/10
U.S. Cl. 343—792.5 **17 Claims**



1. An antenna construction comprising:

a support member,

a signal element including a wire contacting end portion,

a signal wire,

first and second wire securing means mounted in spaced relationship on and along the length of said member to suspend said wire therebetween while insulating said wire from said member, and

means for pivotally mounting said element on while insulating said element from said member to permit said contacting portion to wipe against and engage said suspended wire between said first and second securing means when said element is pivoted from a first non-contacting position to a second wire contacting position.

4,010,474
TWO DIMENSIONAL ARRAY ANTENNA

Joseph H. Provencher, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 5, 1975, Ser. No. 574,216
Int. Cl.² H01Q 3/26
U.S. Cl. 343—814 **7 Claims**

1. A two dimensional antenna array system for simultaneous scanning in the azimuth and vertical comprising:

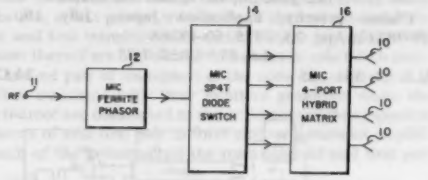
a. phase shift circuit means having an input coupled to an RF energy source and having an output,

b. a plurality of radiating elements positioned to form columns and rows,

c. hybrid matrix circuit means having a plurality of outputs corresponding to the number of said radiating elements, each of said plurality of outputs being connected to a corresponding one of said corresponding plurality of radiating elements, and

d. switch means coupling the output of said phase shift

circuit means to said hybrid circuit means whereby said RF energy is caused to be simultaneous radiated in azimuth and in elevation from said radiating elements, the



number of each of said phase shift circuit means, hybrid circuit means and switch means respectively equal the number of columns formed.

4,010,475

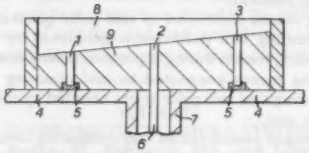
ANTENNA ARRAY ENCASED IN DIELECTRIC TO REDUCE SIZE

James Roderick James, Swindon, England, assignor to The Plessey Company Limited and Plessey Handel und Investments A.G., both of Essex, England

Continuation-in-part of Ser. No. 478,622, June 12, 1974, Pat. No. 3,924,238. This application Aug. 7, 1975, Ser. No. 602,724

Int. Cl.² H01Q *1/40*

U.S. Cl. 343—830 **2 Claims**



1. A radio antenna comprising an active monopole a reflector monopole and at least one director monopole, and low-loss high-permittivity dielectric material surrounding the active monopole and the director monopole, the reflector monopole including a grid of conductive wires, and providing a closure wall for the dielectric material.

4,010,476

METHODS AND APPARATUS FOR RECORDING WELL LOGGING MEASUREMENTS

Jennings W. Elliott, West Redding, Conn., assignor to Schlumberger Technology Corporation, New York, N.Y.

Division of Ser. No. 15,790, March 2, 1970, abandoned, which is a continuation of Ser. No. 520,956, Nov. 4, 1974. This application Nov. 4, 1974, Ser. No. 520,957

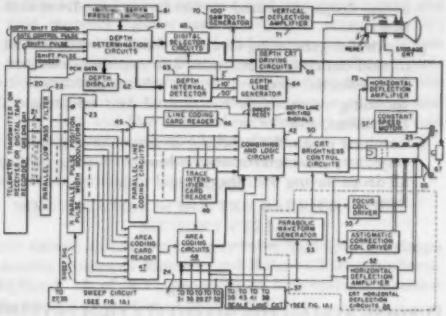
Int. Cl.² G01D *9/00*

U.S. Cl. 346—1 **27 Claims**

1. The method of producing a graphic display of the condition of a signal, comprising the steps of

analyzing said signal to derive a succession of values, each of which represents a successive condition of said signal, and

producing successive substantially parallel lines on a display medium, each of said lines being substantially continuous and extending between two points, the positions of which



represent, respectively, a corresponding two, consecutively derived ones, of said values.

4,010,477

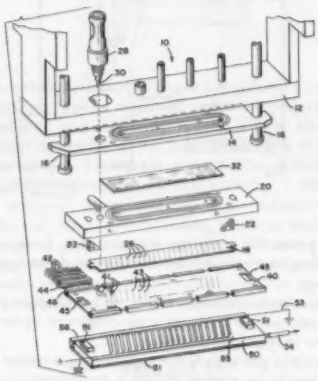
HEAD ASSEMBLY FOR A JET DROP RECORDER

James A. Frey, Kettering, Ohio, assignor to The Mead Corporation, Dayton, Ohio

Filed Jan. 29, 1976, Ser. No. 653,443

Int. Cl.² G01D *15/18*

U.S. Cl. 346—75 **6 Claims**



1. Jet drop recording apparatus comprising:

a. a recording liquid supply manifold,

b. an elongated orifice plate communicating with said manifold and provided with a plurality of orifice sets each comprising a plurality of uniformly sized and regularly spaced orifices arranged along a placement line extending angularly relative to the main axis of said orifice plate, said placement lines being parallel and having orifices placed therein such that members of a set of evenly spaced spacing lines parallel to said axis each pass through one orifice in each of said orifice sets,

c. a charge plate mounted in parallel relation to said orifice plate and provided with a series of charging electrodes in alignment with said orifices,

d. drop generating means for causing streams of recording liquid to flow continuously through said orifices and break up into drops at a regular frequency, said stream break-up into drops occurring in the region of said charging electrodes,

e. charge control means electrically connected to said charging electrodes for charging selected ones of said drops in accordance with image information to be recorded,

f. a deflection electrode assembly comprising angularly extending deflection electrodes arranged parallel to said placement lines and positioned for passage therebetween of the drops generated by streams issuing from said orifice sets,

g. means for generating electrical fields between paired sets of said deflection electrodes and creating deflected and non-deflected drop trajectory characterizations corresponding respectively to charged and uncharged drop conditions, and

h. catching means for catching all drops having one of said trajectory characterizations while permitting passage of all drops having the other of said trajectory characterizations.

4,010,478

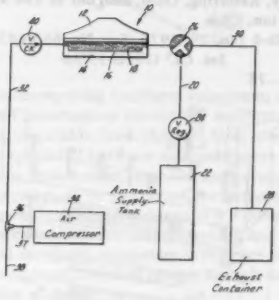
PURGING SYSTEM FOR DIAZOTYPE FILM DEVELOPER

Johannes K. Jantzen, Mountain View, Calif., assignor to Addressograph Multigraph Corporation, Cleveland, Ohio

Filed Aug. 14, 1975, Ser. No. 601,009

Int. Cl.² G03D *7/00*

U.S. Cl. 354—300 **6 Claims**



6. A system for purging contaminants from a developer station using ammonia gas for developing diazo type materials, comprising:

developer means actuable from an inoperative to an operative position to perform a development cycle and return to the inoperative position;

an ammonia gas supply for supplying gas under pressure to the developer station during a development cycle;

valve means operable between a first position to permit flow of gas from the gas supply to the developer station during a development cycle, and a second position to permit exhausting the gas from the developer station;

a check valve operable between a closed position to prevent escape of the gas from the developer station during a development cycle, and an open position to permit flow of compressed air therethrough when the valve means is in the second position;

a compressed air supply means for supplying air to the developer station when the check valve is in the open position to perform a purging operation for purging the developer station of contaminants;

an exhaust container for collecting the contaminants from the developer station; and

an exhaust flow extending from the valve means to the exhaust container for delivering the contaminants to the exhaust container when the valve means is in the second position;

said developer means being actuated from the operative to the inoperative position following a purging operation of the developer station while the compressed air continues to be supplied to the developer station until a subsequent development cycle is initiated.

4,010,479

FOCUSING APPARATUS FOR OPTICAL SYSTEMS

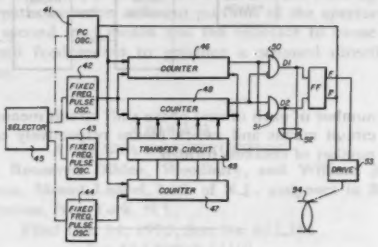
Tsukumo Nobusawa, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed June 30, 1975, Ser. No. 591,464

Claims priority, application Japan, July 10, 1974, 49-78212; Apr. 23, 1975, 50-49268

Int. Cl.² G03B *7/08*

U.S. Cl. 354—25 **24 Claims**



1. Focusing apparatus for use in an optical system comprising:

at least one photoconductive elememt mounted such that an imaging lens forming part of an optical system directs light onto its photosensitive surface and having an internal resistance that varies in accordance with the intensity of light impinging onto its photo sensitive surface;

pulse generating means for generating pulse trains, said pulse generating means connected to said at least one photoconductive element such that the frequency of the pulses generated by said pulse generating means is related to the internal resistance of said at least one photoconductive element;

counting means connected to said pulse generating means for counting two pulse trains generated by said pulse generating means during a predetermined time period;

comparing means connected to said counting means for comparing said two pulse trains counted by said counting means; and,

output means connected to said comparing means for providing one form of output when said comparing means determines that said two pulse trains include an equal number of pulses and a different form of output when said comparing means determines that said two pulse trains include different numbers of pulses, said equality of pulses occurring when said optical system is in focus.

4,010,480

CONTROL CIRCUIT FOR AUTOMATICALLY CONTROLLING A DIAPHRAGM OF A CAMERA

Takayoshi Sato, Tokyo, Japan, assignor to Yugenkaisha Sato Kenkyusho, Tokyo, Japan

Filed Aug. 12, 1975, Ser. No. 604,067

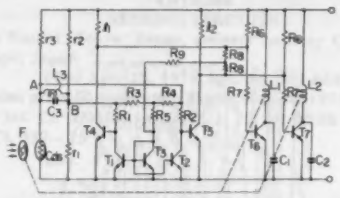
Claims priority, application Japan, Aug. 19, 1974, 49-94240; Aug. 19, 1974, 49-94241

Int. Cl.² G03B *7/08*

U.S. Cl. 354—43 **6 Claims**

1. Control circuit for automatically controlling a diaphragm of a camera for proper exposure comprising a pair of coils for actuating diaphragm adjusting means coupled with said diaphragm, one of said coils, when energized, actuating said adjusting means in one direction for opening said diaphragm while the coil, when energized, actuates said adjusting means in the opposite direction for closing said diaphragm, and a circuit having photoelectric element for generating a first input and a second input for the respective one of said coils varying oppositely to each other depending upon the scene light quantity received by said photoelectric element through said diaphragm so that said diaphragm is driven and held at

the proper exposure condition at the balance point of said first and said second input under the condition of said scene light quantity received by said photoelectric element through said diaphragm, a first transistor with its emitter grounded while its collector is connected to the base thereof to effect diode connection, a first pair of transistors of the same characteristics as said first transistor with their emitters grounded while the bases thereof are connected to the base of said first transistor, a second pair of transistors of the same characteristics as said first transistor with their emitters grounded while the bases thereof are connected to the collectors of the respective transistors of said first pair to form emitter grounded amplifiers, each of the collectors of the transistors of said first pair



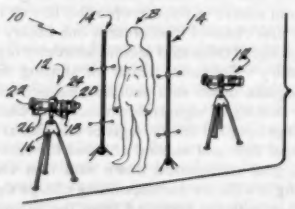
being connected to said first input and said second input through a resistor, respectively, while the collector of said first transistor is connected through a resistor to the midpoint of a resistor connected between said first input and said second input, each of the collectors of the transistors of said second pair being connected to the respective one of said pair of coils, a first resistor connected between said collectors of the transistors of said second pair, the midpoint of said first resistor being connected through a second resistor to the midpoint of said resistor connected between said first and second input so as to effect negative feedback, the current flowing through said pair of coils being thereby reduced to the minimum at the balance point of said first and said second input at which said diaphragm is held at the proper exposure condition.

4,010,481

STEREOMETRIC CAMERA SYSTEM

Joseph O. Danko, Jr., Baltimore, Md., and Jaime R. Cuzzi, Houston, Tex., assignors to Danko Arlington, Inc., Baltimore, Md.

Filed Oct. 14, 1975, Ser. No. 621,785
Int. Cl.² G03B *35/08*
U.S. Cl. 354—113 **21 Claims**



1. A camera for a stereophotogrammetric assembly, comprising:

a. a camera housing,

b. a flat transparent plate in said camera housing,

c. a lens associated with said housing, said lens being adjustable with respect to said flat plate,

d. means for adjusting the distance of said lens from said glass plate, and

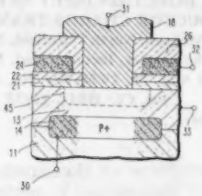
e. means for holding a film length flatly against said flat transparent plate during exposure of said film, said means comprising (i) a film engaging member, (ii) a shaft operatively connected at one end thereof to said film engaging member by means for allowing pivotal movement therebetween, (iii) means for biasing said film engaging member into engagement with said flat plate, for flatly pressing a film length located between said transparent plate and said member against said transparent plate, and (iv) means located exteriorly of said housing attached to said shaft for moving said film engaging member from a position pressing said member into engagement with said film to a position wherein said member is spaced from said glass plate and film disposed between said plate and said member may be removed therefrom.

4,010,482

NON-VOLATILE SCHOTTKY BARRIER DIODE MEMORY CELL

Shakir Ahmed Abbas, Wappingers Falls; Narasipur Gundappa Anantha, Hopewell Junction, and Robert Charles Dockerty, Highland, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 31, 1975, Ser. No. 645,767
Int. Cl.² H01L *29/48, 29/56, 29/64, 29/78*
U.S. Cl. 357—15 **5 Claims**



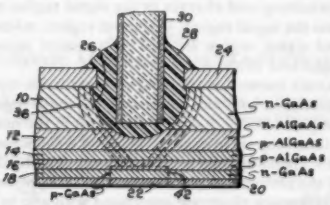
1. A non-volatile memory element comprising a substrate of one conductivity type, a region of opposite conductivity type provided within said substrate having a first electrode in ohmic contact therewith, an epi layer of said first conductivity type formed upon said substrate, a second electrode in contact with said epi layer through a Schottky barrier, a thin layer of insulating material upon said epi layer adjacent to said Schottky barrier, said layer including electron trapping centers and trapped electrons therein when a bias exceeding a critical value is applied across said Schottky barrier, and a layer of conductive material deposited on said layer of insulating material and having a third electrode in ohmic contact therewith.

4,010,483

CURRENT CONFINING LIGHT EMITTING DIODE

Yet-Zen Liu, Fort Wayne, Ind., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed Aug. 8, 1974, Ser. No. 495,488
Int. Cl.² H01L *33/00*
U.S. Cl. 357—17 **7 Claims**



1. A light emitting gallium arsenide-gallium aluminum arsenide diode comprising:

a substrate layer of GaAs of a first conductivity type,

a first layer of AlGaAs of said first conductivity type over said substrate layer,

a second layer of AlGaAs on said first layer of AlGaAs, said second layer having a different Al concentration than said first layer,

a third layer of AlGaAs of a second conductivity type on said second layer of AlGaAs,

a fourth layer of GaAs on said third layer of AlGaAs,

a first metal contact electrode in a central area on said fourth layer,

a second metal contact electrode on the opposite side of said substrate layer,

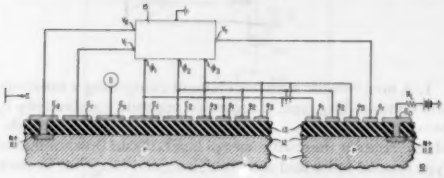
a light emitting well hole in a central area of said metal electrode on said substrate layer and in said substrate layer, and

an area of proton bombardment induced high resistivity in said first, second, third and fourth layers surrounding said central area adjacent said first metal electrode on said fourth layer, said resistivity being sufficient to provide a current conduction barrier, said central area adjacent said first electrode being of a low resistivity within said surrounding high resistivity area.

4,010,484
CHARGE INJECTION INPUT NETWORK FOR SEMICONDUCTOR CHARGE TRANSFER DEVICE

Amr Mohamed Mohsen, North Plainfield, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Aug. 16, 1974, Ser. No. 498,052
Int. Cl.² H01L *29/78*
U.S. Cl. 357—24 **8 Claims**



1. Apparatus including an input network for a charge transfer device medium which comprises:

a. an input region in the medium for periodically injecting charge into the medium;

b. a reference region contiguous to the input region;

c. a signal region contiguous to the reference region and spatially followed by the bulk of the charge transfer device, the potential of the signal region being controlled by a signal, the signal region thereby collecting charges injected by the input region through the reference region in accordance with the signal for subsequent transfer of said charges as packets through the bulk of the charge transfer device, and the reference region serving as a constant reference potential region both for transfer of charges from the input region to the signal region and for containing said charges in the signal region after transfer into the signal region, said input region, reference region, and signal region located in a spatial sequence at the input end of the device;

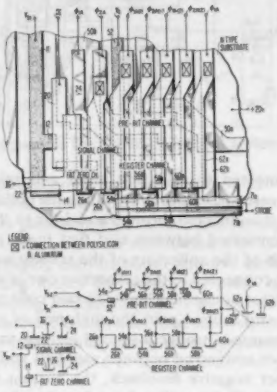
d. circuit means for applying voltages to an input electrode associated with and contacting the input region sufficient for periodically injecting charges into the medium during a time interval in each off phase of a clock pulse sequence of voltages applied to a first transfer electrode of the bulk of the charge transfer device, and for applying voltages to a reference electrode associated with and in proximity to the reference region sufficient to maintain said reference region at the reference potential V_r which is constant in time, the electrodes associated with the signal region, the first transfer electrode and a next in sequence second transfer electrode of the bulk of the transfer device being all at least about twice as long in the charge transfer direction in the device as the other electrodes in the bulk of the charge transfer device, said other electrodes all being substantially of the same length in the charge transfer direction; and

e. circuit means for applying voltages to an electrode associated with the signal region in accordance with the signal.

4,010,485
CHARGE-COUPLED DEVICE INPUT CIRCUITS

Donald Jon Sauer, Plainsboro, N.J., assignor to RCA Corporation, New York, N.Y.

Filed June 13, 1974, Ser. No. 479,050
Int. Cl.² H01L *29/78*
U.S. Cl. 357—24 **6 Claims**



1. A charge coupled device shift register comprising, in combination:

a first charge coupled device register channel including a source of minority charge carriers, means for periodically introducing into said channel a fixed amount of charge signal from said source and means for shifting said charge signal down said channel;

a second charge coupled device register channel including a second source of minority charge carriers, means for periodically introducing into said second channel, concurrently with the introduction of said fixed amount of charge into said first channel, one of a charge signal from said second source in fixed proportion to that introduced into said first channel to represent one binary value, and no charge signal from said second source to represent the other binary value, and means for shifting the *a* and *b* charge signals down said second channel concurrently with the shifting of signals down said first channel;

a third charge coupled device register channel at the output end of said first and second channel for receiving each charge signal transmitted down said first channel and combining it with the corresponding charge signal *a* or *b*, as the case may be, received from the second channel, and including means for propagating the combined charge signal down said third channel;

a fourth charge coupled device register channel including a third source of minority charge carriers, means for introducing into said channel a charge signal from said third source, and means for propagating said charge signal down said fourth channel, said fourth channel connected at its output end to said third channel at a point beyond where said first and second channels join said third channel; and

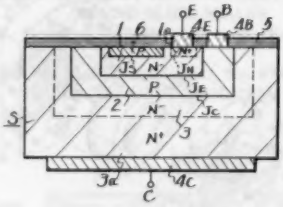
means for controlling said fourth charge coupled register channel to introduce one charge signal from said third

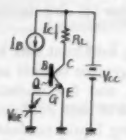
source into said fourth channel only at the start of each stream of M charge signals introduced at said second channel, each such stream having a leading end, and timed so that said one charge signal reaches said third channel before and within, at most, several periods of the periodically introduced charge signals, of the time the leading end of said stream reaches the point where said fourth channel joins said third channel, where M is an integer equal to at least 10.

4,010,486
SENSING CIRCUITS

Sadao Suzuki, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Apr. 25, 1975, Ser. No. 571,688
Claims priority, application Japan, May 10, 1974, 49-52116
Int. Cl.² H01L *29/66, 27/22, 29/74;* **H03K** *3/26*
U.S. Cl. 357—25 **7 Claims**



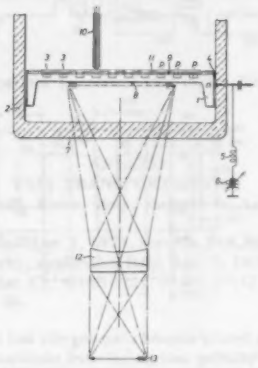


1. A sensing circuit for detecting a change in a characteristic of an object comprising a semiconductor device having a first semiconductor region of one conductivity type forming an emitter region, a second semiconductor region of the opposite conductivity type forming a base region adjacent said first region with a first semiconductor junction therebetween, a third semiconductor region of the same conductivity type of said first region forming a collector region adjacent said second region with a second semiconductor junction therebetween, an insulating layer on the outer surface of said emitter region, a gate electrode on said insulating layer forming a gate over said emitter region only, said semiconductor device having an emitter grounded current amplification variation in response to changes in voltage between said emitter region and said gate, said variation exhibiting a minimum value at a first voltage between said emitter region and gate and an increasing value for voltages higher and lower than said first voltage, an output circuit connected to said collector region, a base bias circuit connected to said base region, a gate bias circuit connected to said gate, one of said bias circuits including a sensing element for detecting the change in characteristic of said object and the other bias circuit including a bias adjustment element, whereby a change in the object characteristic creates a variation in the current amplification which changes a voltage level in the output circuit.

4,010,487
SEMICONDUCTOR ARRANGEMENT

Gunter Absalon; Konrad Fischer, both of Heilbronn, and Rainer Grosholz, Heilbronn-Bockingen, all of Germany, assignors to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Filed Feb. 23, 1972, Ser. No. 228,645
Claims priority, application Germany, Mar. 2, 1971, 2109814
Int. Cl.² H01L *27/14*
U.S. Cl. 357—31 **11 Claims**



1. A multidiode charge store for an electron beam picture pickup tube comprising in combination; a semiconductor body of a first type of conductivity, a plurality of juxtaposed regions of a second type of conductivity formed in said semiconductor body from one surface thereof and forming respective diodes therewith, an insulating layer on said surface of said semiconductor body and defining an opening above each of said plurality of regions of said second type of conductivity which openings extend to said surface of said semiconductor body, and a resistance layer provided on said one surface of said semiconductor body, said resistance layer covering the exposed portions of said regions within said openings in said insulating layer and extending over at least the adjacent portions of said insulating layer surrounding said openings, said resistance layer having a resistance which is sufficiently high so as to constitute a means for avoiding an interfering charge of said insulating layer by the electron beam scanning said surface of said semiconductor body and a discharge of the barrier layer capacitance of the diodes between two successive scans, said resistance layer comprising a metal silicide compound with the metal being selected from the subgroups of groups V and VI of the periodic table which contain tantalum, molybdenum or tungsten.

4,010,488
ELECTRONIC APPARATUS WITH OPTIONAL COUPLING

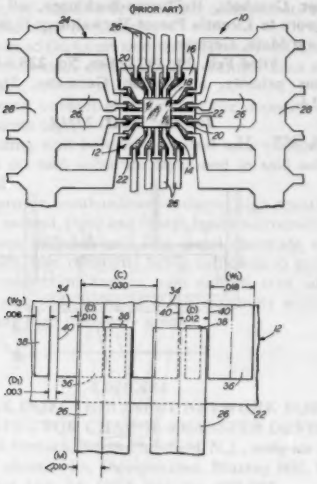
Raymond F. Gruszka, Reading, and Clarence A. Warczyglowa, Laureldale, both of Pa., assignors to Western Electric Company, Inc., New York, N.Y.

Filed Nov. 21, 1975, Ser. No. 634,211
Int. Cl.² H01L *23/48, 29/44, 29/52, 29/60*
U.S. Cl. 357—70 **12 Claims**

1. Electronic apparatus comprising a circuit element and means providing preselected electrical coupling to said element, said means including first and second spaced apart coupling sites and first and second conductive members individually coupled to said first and second sites, respectively; and

a third coupling site disposed between and spaced from said

first and second coupling sites, either one of said first and second conductive members being coupleable to its respective first or second coupling site and to said third site without altering said preselected electrical coupling.



4,010,489

HIGH POWER SEMICONDUCTOR DEVICE COOLING APPARATUS AND METHOD

Frank J. Bourbeau; Barton L. Meredith, both of Santa Barbara, and Arnold J. Rakowski, Goleta, all of Calif., assignors to General Motors Corporation, Detroit, Mich.

Filed May 19, 1975, Ser. No. 578,717

Int. Cl.² H01L *25/04*, *23/32*; **F28F** *7/00*; **H01B** *7/34*

U.S. Cl. 357—82 **5 Claims**

1. Apparatus for liquid cooling high power semiconductor devices having oppositely disposed flat and parallel end faces substantially perpendicular to a central axis on said devices and forming terminals for said devices, said apparatus comprising:

at least two axially aligned heat sink members for supporting said semiconductor devices;

each of said heat sink members having a flat face portion adapted for contact with the flat terminal end of a high power rectifier package;

a tortuous groove in a mating face portion of said device terminals and said heat sink members to provide a liquid coolant circulation channel in which liquid coolant directly contacts the end face of said device;

an inlet passage in each of said heat sink members communicating with said groove for introducing liquid coolant into said circulation channel for circulation against said flat terminal end;

at least one outer end portion on each of said grooves exposed at the radial periphery of contact between said terminal end and said heat sink member, providing an outlet for liquid coolant circulated through said circulation channel from said inlet passage for said groove;

means for clamping said heat sink members against their respective terminal end faces of said high power semiconductor device with each terminal end face cooperating with its respective heat sink to form said circulation channel with a circulation channel outlet at the periphery of said terminal end face;

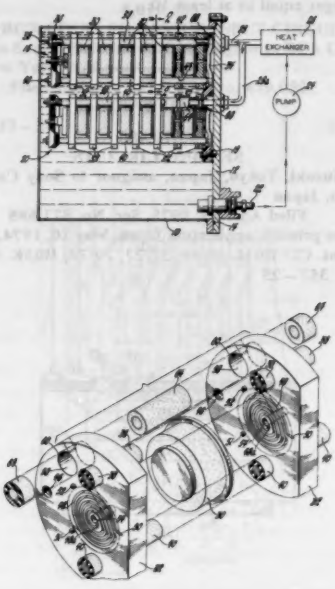
said faces of said heat sink members having apertures therein communicating with said inlet passages;

flexible and resilient liquid coolant conduit means extending between said faces of said heat sink members and circumferentially frictionally engaging said apertures in a sealing relationship;

aperture means in said liquid coolant conduit means communicating with said inlet passages;

one of said heat sink member apertures being one end of a bore extending through said heat sink member;

means for introducing a nonconductive liquid coolant to the other end of said bore for circulation through both of said grooves;



a container enclosing said heat sink members for receiving coolant from said groove outlets and any coolant resulting from leakage, and for maintaining said heat sink members immersed in said coolant; and

means for withdrawing liquid coolant from said container, cooling it, and recirculating it back to said heat sink bore.

4,010,490

VIDEO RECORDING AND REPRODUCING APPARATUS WITH CROSSTALK REDUCTION

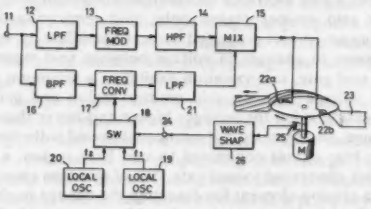
Yoshihiko Ota, Yokohama, Japan, assignor to Victor Company of Japan, Limited, Yokohama, Japan

Filed Dec. 17, 1975, Ser. No. 641,433

Claims priority, application Japan, Dec. 19, 1974, 49-146099

Int. Cl.² H04N *5/79*, *5/795*

U.S. Cl. 358—4 **15 Claims**



1. A color video signal recording system comprising:

means for separating an input color video signal into a luminance signal and a carrier chrominance signal;

means for frequency modulating a carrier wave responsive to the separated luminance signal;

first frequency conversion means responsive to the separated carrier chrominance and wave signals for frequency converting the separated carrier chrominance signal into a band which is lower than the band of the frequency modulated luminance signal;

means for mixing the frequency modulated luminance signal and the frequency converted carrier chrominance signal;

means for recording the mixed signals in a plurality of parallel tracks on a recording medium; and

first signal supplying means for producing the wave signals alternately having frequencies $f1$ and $f2$ each time that the recording means scans one of the tracks and for supplying the wave signals to said first frequency conversion means;

the values of the frequencies $f1$ and $f2$ satisfying the equation $f1 - f2 = (N/2)f_H$, where N is an odd integer, and f_H denotes the horizontal scanning frequency of the video signal.

4,010,491

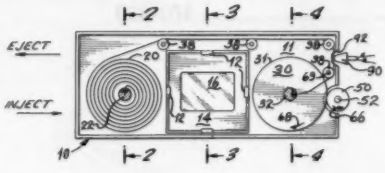
AUTOMATICALLY RETRACTABLE TAPE IN SOUND-SLIDE MEANS

Martin E. Gerry, 13452 Winthrope St., Santa Ana, Calif. 92705

Filed Mar. 26, 1976, Ser. No. 671,015

Int. Cl.² G11B *13/04, 23/04*

U.S. Cl. 360—1 **21 Claims**



1. In combination, a slide and magnetic tape retainer, comprising:

means integral with the retainer for securing the slide; and

a magnetizable tape which is also a self retractable spiral spring.

4,010,492

USING A RADIO FEEDBACK LINK TO THE ENGINEER

Randolph C. Wood, 301 S. Beverly Glen Blvd., Los Angeles, Calif. 90024

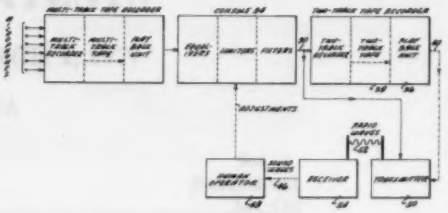
Filed July 21, 1975, Ser. No. 597,543

Int. Cl.² G11B *5/02;* **H04B** *7/00*

U.S. Cl. 360—25 **9 Claims**

1. In a system for producing a master recording having means for filtering and mixing a number of input audio signals prior to recording them as a master recording and wherein an operator controls the means for filtering and mixing of the signals in response to an audible presentation of the filtered and mixed signals, the improvement comprising:

means responsive to the filtered and mixed signals to produce through a radio link the audible presentation used



by the operator to control said means for filtering and mixing.

4,010,493

TAPE TRANSPORT DEVICE

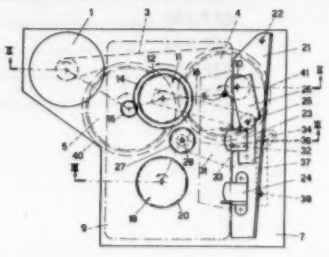
Rodolfo Cicatelli, Rome, Italy, assignor to Autovox S.p.A., Rome, Italy

Filed Apr. 1, 1975, Ser. No. 564,206

Claims priority, application Italy, Apr. 5, 1974, 50169/74

Int. Cl.² G11B *5/54, 15/26, 21/12*

U.S. Cl. 360—96 **5 Claims**



1. A tape transport device for cassette recorders, wherein a motor drives a flywheel and an idler wheel and wherein the capstan is formed by the shaft of said flywheel, said device comprising:

a wind member wherein a first gear is releasably coupled to a second gear coaxial with it, said second gear meshing with a pinion rigid with said idler wheel;

a freely rotatable rewind member;

a flip-over arm carrying upper and lower twin gears at one end, said flip-over arm being movable into a first position, wherein the upper one of its twin gears engages said first gear of the wind member and the lower one engages a gear which is rigid and coaxial with said flywheel, to transmit thereby the drive of said motor to said wind member, and is movable into a second position, wherein its upper twin gear engages said rewind member while its lower twin gear engages a gear which is rigid and coaxial with the idler wheel, to transmit thereby a rewind motion from the motor to the rewind member, and is movable into a third, inoperative position intermediate its first and second position.

DESIGN PATENTS

GRANTED MARCH 1, 1977

ERRATA

For CLASS	See PATENT NO.
023–090	243,510
014–042	243,534
064–011 B	243,535
014–057	243,536
014–095	243,537
014–006	243,538
024–029	243,542
024–029	243,543
015–199	243,551
015–092	243,552
015–199	243,553
014–075	243,554
015–072	243,555
024–009	243,556
028–018	243,558
028–038	243,559

DESIGN PATENTS

GRANTED MARCH 1, 1977

ERRATA

Pat. Cl.	Des. Patent No.
D23-000	243,510
D16-062	243,724
D26-011 B	243,735
D16-057	243,726
D16-065	243,727
D16-008	243,728
D24-029	243,842
D24-029	243,843
D15-109	243,921
D15-065	243,922
D17-199	243,923
D16-075	243,924
D15-072	243,925
D24-009	243,926
D28-018	243,928
D26-019	243,929

DESIGNS

MARCH 1, 1977

243,481
SANDWICH
Melvin A. Benedict, 1228 Long Run Road, McKeesport, Pa. 15121
Filed Sept. 9, 1974, Ser. No. 504,171
Term of patent 14 years
Int. Cl. D1—*99*
U.S. Cl. D1—15

243,482
SWIM GOGGLES
Simon C. Fireman, Quincy, Mass., assignor to Aqua-Leisure Industries, Inc., Avon, Mass.
Filed Jan. 14, 1976, Ser. No. 649,029
Term of patent 14 years
Int. Cl. D2—*03*
U.S. Cl. D2—234

243,483
BOOT
Thaddeus A. Pietraszek, Waterbury; Richard J. Van Twisk, Naugatuck, and Algis B. Brazdzionis, Oakville, all of Conn., assignors to Uniroyal Inc.
Filed Oct. 1, 1975, Ser. No. 618,530
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—275

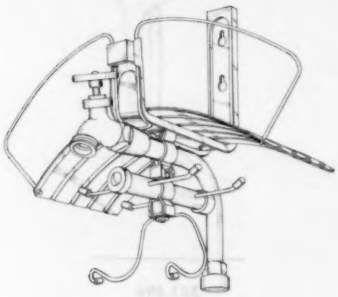
243,484
PROTECTIVE HELMET, OR THE LIKE
Jhoon Goo Rhee, 2525 N. Ridgeview Road, Arlington, Va. 22207
Filed Oct. 21, 1975, Ser. No. 624,412
Term of patent 14 years
Int. Cl. D2—*03*
U.S. Cl. D2—232

243,485
STOCKING
Sonja E. Hedgepeth, 2118 Walnut St., Philadelphia, Pa. 19103
Filed Jan. 8, 1975, Ser. No. 539,534
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—330

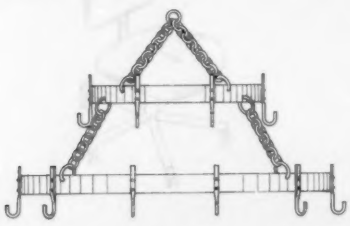
243,486
CHAIR
Randall P. Buhk, Wyoming, Mich., assignor to Steelcase, Inc., Grand Rapids, Mich.
Filed Sept. 5, 1975, Ser. No. 610,837
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—30

243,487
SECRETARIAL ARM CHAIR
Randall P. Buhk, Wyoming, Mich., assignor to Steelcase, Inc., Grand Rapids, Mich.
Filed Sept. 5, 1975, Ser. No. 610,836
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—31

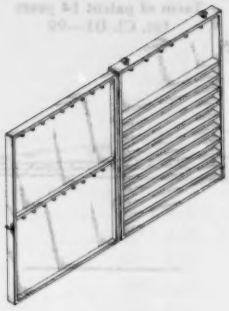
243,488
COMBINATION FAUCET EXTENDER AND GARDEN HOSE RACK
Lincoln L. Linse, 13625 NW. Westlawn Terrace, Portland, Oreg. 97229
Filed Sept. 22, 1975, Ser. No. 615,296
Term of patent 14 years
Int. Cl. D6—*06*; D23—*01*
U.S. Cl. D6—112

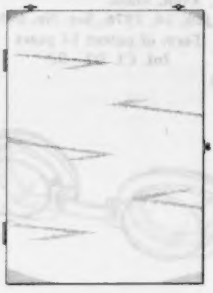


243,489
HANGING SUPPORT FOR POTS, PANS, OR THE LIKE
Jacque E. Moore, P.O. Box 1791, Spokane, Wash. 99207
Filed May 27, 1975, Ser. No. 581,290
Term of patent 7 years
Int. Cl. D6—*04*
U.S. Cl. D6—113

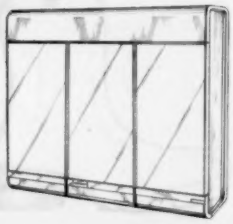


243,490
JEWELRY CABINET
Arden R. Reusink, 6339 Brooks Drive, Arvada, Colo. 80004
Filed May 19, 1976, Ser. No. 688,099
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—127

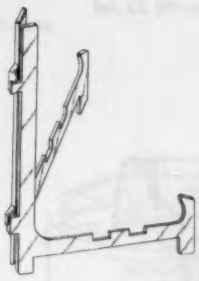




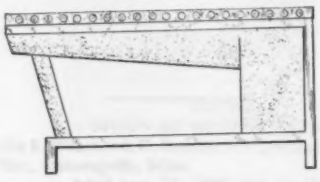
243,491
MIRRORED BATHROOM CABINET
Guy Vrignaud, Grenoble, France, assignor to Allibert Exploitation Societe Anonyme, Puteaux, France
Filed June 21, 1974, Ser. No. 481,863
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—129



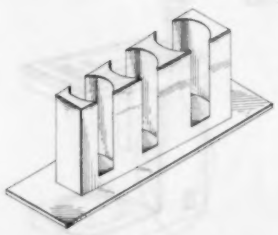
243,492
DISPLAY STAND
Michael Stewart Gorwits, 32 Allerton Grove, Leeds LS17 6RQ, England
Filed May 21, 1976, Ser. No. 688,913
Term of patent 14 years
Int. Cl. D6—*04*; D20—*02*
U.S. Cl. D6—140



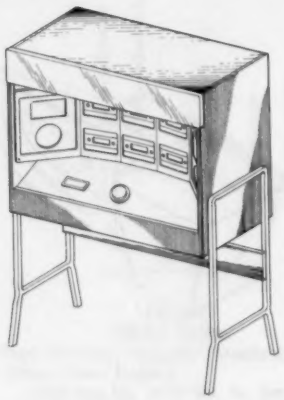
243,493
MIXING AND CASTING TABLE
Maurice E. Meisner, 3107 Millers Lane, Louisville, Ky. 40216
Continuation-in-part of Ser. No. 508,424, Sept. 23, 1974, abandoned, and a continuation-in-part of Ser. No. 273,811, July 21, 1972, abandoned. This application Oct. 15, 1975, Ser. No. 622,694
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—177



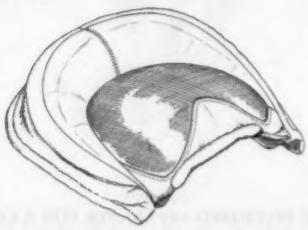
243,494
HOLDER FOR COINS
Hsio Wang, 2850 Citadel Drive NE., Warren, Ohio 44483
Filed Sept. 2, 1975, Ser. No. 609,345
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—188



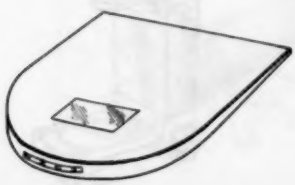
243,495
DISPLAY APPARATUS FOR AUTOMOBILE SOUND ENTERTAINMENT PRODUCTS OR THE LIKE
Paul Dean McGee, Medinah, Ill., assignor to Motorola, Inc., Schaumburg, Ill.
Filed Aug. 1, 1975, Ser. No. 601,110
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—190



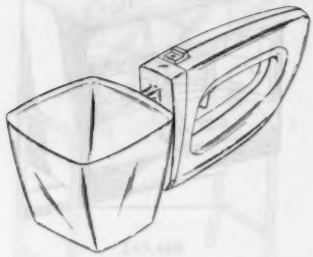
243,496
VENTILATED COVER FOR MOTORCYCLE SEAT
Robert E. Flowers, Rte. 1, 3 Mile Lake, Bayshore Drive, Paw Paw, Mich. 49079
Filed Oct. 3, 1975, Ser. No. 619,194
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D6—191



243,497
CLOTHES HANGER BODY
José Brufau, 19, Santa Magdalena Sofia St., Barcelona, Spain
Filed Nov. 16, 1973, Ser. No. 416,411
Term of patent 3½ years
Int. Cl. D6—*08*
U.S. Cl. D6—257

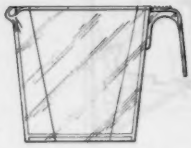


243,498
CORDLESS ELECTRICALLY HEATED CUP
Pino Pianezza, 1129 S. Spring St., Springfield, Ill. 62704
Filed June 26, 1975, Ser. No. 590,464
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—9

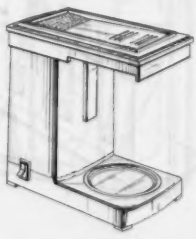


243,499
WATER METERING APPARATUS FOR A COFFEE MAKER OR SIMILAR ARTICLE
Hans Joachim Hugo Julkenbeck, Wijnjeterp, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Feb. 3, 1975, Ser. No. 546,395
Claims priority, application Switzerland, Aug. 19, 1974, 59307/74
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—41

243,500
MEASURING CUP
Jack P. Cooper, 118 Riviera Drive South, Massapequa, Nassau, N.Y. 11758
Filed Apr. 21, 1975, Ser. No. 569,598
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D7—50



243,501
COFFEEMAKER
David L. Painter, Glenview, Ill., assignor to Dart Industries Inc., Los Angeles, Calif.
Filed June 6, 1975, Ser. No. 584,541
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—62



243,502
BURNER ASSEMBLY FOR A PORTABLE COOKING STOVE

Ming Kong Chan, 58 Pau Chung St., Tokwawan, Kowloon, Hong Kong

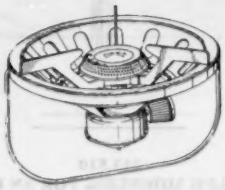
Filed June 11, 1975, Ser. No. 585,984

Claims priority, application United Kingdom, Feb. 21, 1975, 969974/75

Term of patent 14 years

Int. Cl. D7—*04*

U.S. Cl. D7—136



243,503
SPOON OR SIMILAR ARTICLE

Colin B. Richmond, II, Oneida, N.Y., assignor to General Mills, Inc., Minneapolis, Minn.

Filed Aug. 25, 1975, Ser. No. 604,393

Term of patent 14 years

Int. Cl. D7—*03*

U.S. Cl. D7—137

243,504
WOOD RACK, OR SIMILAR ARTICLE

Sammy C. Morrison, Rte. 1, Rogers, Ark. 72756

Filed Aug. 28, 1975, Ser. No. 608,711

Term of patent 14 years

Int. Cl. D7—*08*

U.S. Cl. D7—212

243,505
DRILL GUIDE

Ronald Price Hickman, "Badgers", Middle St., Nazeing, Waltham Abbey, Essex, England

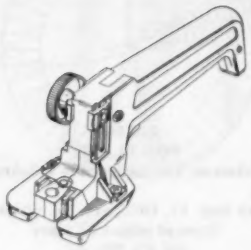
Filed Aug. 20, 1975, Ser. No. 606,334

Claims priority, application United Kingdom, Feb. 21, 1975, 969979/75

Term of patent 14 years

Int. Cl. D8—*05*

U.S. Cl. D8—14



243,506
SKATE BOARD ADJUSTMENT TOOL

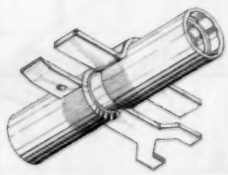
Albert J. Hess, 8837 Brookdale Drive, Garden Grove, Calif. 92644

Filed Nov. 3, 1975, Ser. No. 628,080

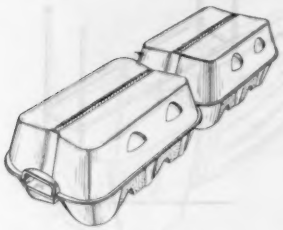
Term of patent 14 years

Int. Cl. D8—*05*

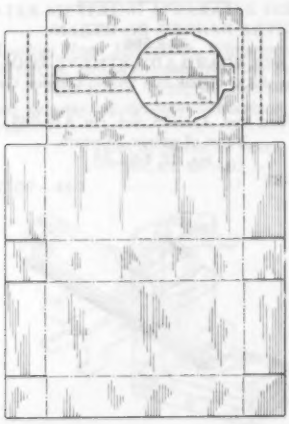
U.S. Cl. D8—87



243,507
EGG CARTON
Jorgen Nilaus Petersen, Lyngby, Denmark, assignor to Aktieselskabet Brodrene Hartmann, Lyngby, Denmark
Filed Dec. 2, 1974, Ser. No. 528,668
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—190

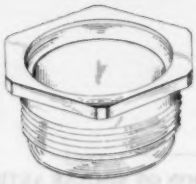


243,508
BOX BLANK
Earl J. Killy, Monroe, La., assignor to Olinkraft, Inc., West Monroe, La.
Filed Aug. 13, 1975, Ser. No. 604,419
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—245



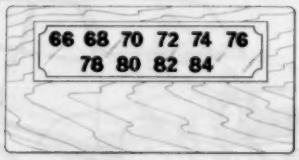
243,509
PLANT STAKE
Philip T. Wheeler, DeWitt, Mich., assignor to The John Henry Company, Lansing, Mich.
Filed Mar. 18, 1976, Ser. No. 668,211
Term of patent 14 years
Int. Cl. D31—*00*
U.S. Cl. D8—1

243,510
SCREW PLUG MOUNTING FOR AN ELECTRIC IMMERSION HEATER
Robert D. Shirey, 207 Ennerdale Drive, Pittsburgh, Pa. 15208, and Joseph L. Lohman, 108 Ringold Ave., Pittsburgh, Pa. 15205
Filed Mar. 22, 1976, Ser. No. 669,153
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D23—90

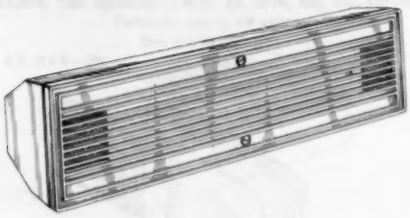


243,511
CLOCK OR SIMILAR ARTICLE
James O. O'Brien, 2101 Hawk Lane, Rolling Meadows, Ill. 60008
Continuation-in-part of Ser. No. 545,323, Jan. 30, 1975, abandoned. This application Jan. 23, 1976, Ser. No. 651,849
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D10—8

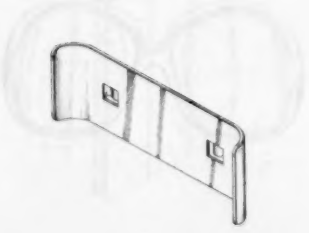
243,512
CARD-MOUNTED THERMOMETER
Philip L. Van Kersen, P.O. Box 40423, Indianapolis, Ind. 46240
Filed June 16, 1975, Ser. No. 586,875
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—57



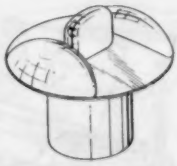
243,513
INTRUSION ALARM
Aaron A. Galvin, Lexington, and Francis R. Keeler, Needham, both of Mass., assignors to American District Telegraph Company, New York, N.Y.
Filed Feb. 12, 1976, Ser. No. 657,709
Term of patent 14 years
Int. Cl. D10—*05*
U.S. Cl. D10—106



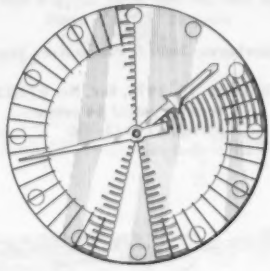
243,514
CLIP-ON WHEEL REFLECTOR FOR BICYCLES
Joseph L. Coulombe, 4351 Drew Ave. South, Apt. No. 3, Minneapolis, Minn. 55410
Filed June 9, 1975, Ser. No. 585,027
Term of patent 14 years
Int. Cl. D26—*06*
U.S. Cl. D10—111



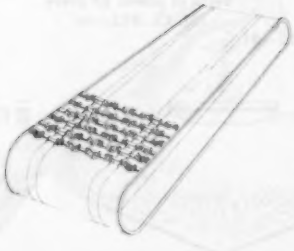
243,515
ROAD MARKER
Mendel King, 46 Primley Park Ave., Leeds 17, Yorkshire, England
Filed Feb. 23, 1976, Ser. No. 660,277
Claims priority, application United Kingdom, Sept. 5, 1975, 972467/75
Term of patent 14 years
Int. Cl. D10—*06*
U.S. Cl. D10—113



243,516
COMBINED DIAL AND HANDS FOR A TIMEPIECE
Hugo Vajk, Kerlaz, France, assignor to Regent Marine & Instrumentation, Inc., Buffalo, N.Y.
Filed Mar. 12, 1975, Ser. No. 557,467
Term of patent 14 years
Int. Cl. D10—*07*
U.S. Cl. D10—126



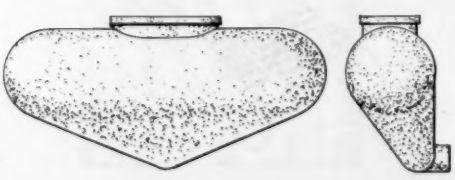
243,517
SNOWMOBILE TRACK
Jean-Rock Belanger, Drummondville, Canada, assignor to Bombardier Limited
Filed July 1, 1975, Ser. No. 592,272
Claims priority, application Canada, Mar. 21, 1975, 210375
Term of patent 14 years
Int. Cl. D12—*14*
U.S. Cl. D12—7



243,518
MULTIPLE USE SERVICE CART
Richard R. Dillon, Marlboro, and John F. Graham, Sudbury, both of Mass., assignors to Honeywell Information Systems, Inc., Waltham, Mass.
Filed Nov. 3, 1975, Ser. No. 627,957
Term of patent 14 years
Int. Cl. D12—*02*
U.S. Cl. D12—29

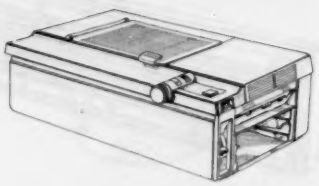
243,519
BOAT
Charles W. Sherburne, 3409 S. Patton Ave., San Pedro, Calif. 90731
Filed Apr. 15, 1976, Ser. No. 677,228
Term of patent 14 years
Int. Cl. D12—*06*
U.S. Cl. D12—63

243,520
HELICOPTER TANK
Erben G. Brown, San Marcos, Calif., assignor to Golden State Helicopters, Inc., San Marcos, Calif.
Filed Jan. 8, 1976, Ser. No. 647,397
Term of patent 14 years
Int. Cl. D12—*99*
U.S. Cl. D12—81

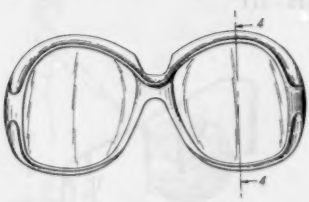


243,521
CAR BODY
Michel Tixier, Boulogne-Billancourt, France, assignor to Regie Nationale des Usines Renault
Filed Dec. 1, 1975, Ser. No. 636,458
Claims priority, application France, June 2, 1975, 73.921
Term of patent 14 years
Int. Cl. D12—*08*
U.S. Cl. D12—91

243,522
ELECTROSTATIC COPIER
Kenichi Nakade, Tokyo, Japan, assignor to Ricoh Co., Ltd.
Filed Oct. 17, 1975, Ser. No. 623,347
Term of patent 7 years
Int. Cl. D16—*03*
U.S. Cl. D16—31



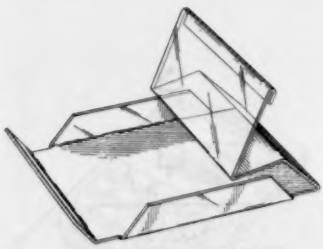
243,523
PAIR OF SPECTACLES
Richard W. Canavan, III, South Woodstock, Conn., assignor to American Optical Corporation, Southbridge, Mass.
Filed Dec. 8, 1975, Ser. No. 638,487
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—65



243,524
COMBINED CALENDAR HOLDER AND NOTE PAPER DISPENSER

Thomas Intini, Ville Brossard, Canada, assignor to Maypack Inc., St. Laurent, Canada

Filed July 9, 1975, Ser. No. 594,253
Term of patent 14 years
Int. Cl. D19—*02*
U.S. Cl. D19—21



243,525
MENU HOLDER

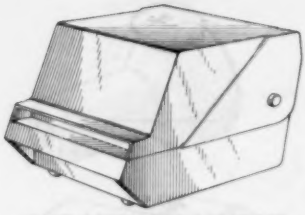
Robert A. Summers, 5 Coventry Drive, Freehold, N.J. 07728, and Henry Leong, 6 Waller Court, Kendall Park, N.J. 08824

Division of Ser. No. D. 284,570, Aug. 29, 1972, Pat. No. D. 233,804. This application Sept. 13, 1974, Ser. No. 505,941
Term of patent 14 years
Int. Cl. D19—*04*
U.S. Cl. D19—26

243,526
MICROFICHE FILE

John W. Overman, Colgate, Wis., assignor to Bell & Howell Company, Chicago, Ill.

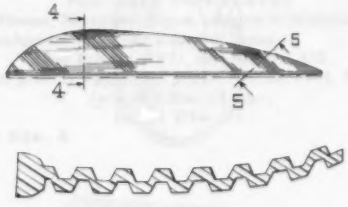
Filed Mar. 31, 1975, Ser. No. 563,559
Term of patent 14 years
Int. Cl. D19—*02*
U.S. Cl. D19—76



243,527
ARTIFICIAL ARROW FLETCH

Leonard Henery Schnipke, Rte. No. 1, P.O. Box 89, Cloverdale, Ohio 45827

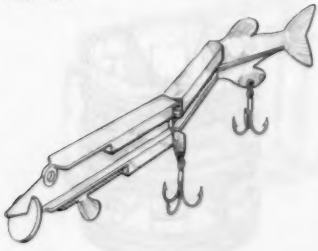
Filed Aug. 20, 1975, Ser. No. 606,306
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—12



243,528
FISH LURE

Francis E. Ryder, Elmhurst, and Michael D. Thomas, Barrington, both of Ill., assignors to Ryder International Corporation, Schaumberg, Ill.

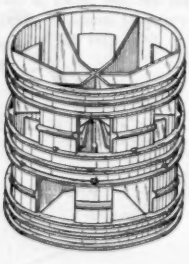
Filed Nov. 19, 1975, Ser. No. 633,502
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—28



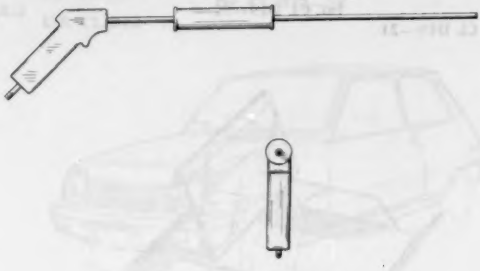
243,529
SNAKE HEAD SLIP SINKER
Richard D. Woodard, 224 S. 16th, Guthrie, Okla. 73044
Filed July 23, 1975, Ser. No. 598,174
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—30

243,530
PORTABLE AIR SUPPLY TANK
Kenneth E. Bodine, 660 E. Geddes, Littleton, Colo. 80122, and Verle A. McDowell, 4675 S. Lincoln, Englewood, Colo. 80110
Filed July 24, 1975, Ser. No. 598,705
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—2

243,531
FILTER MEDIA
Ralph F. Strigle, Jr., Akron, Ohio, assignor to Norton Company, Worcester, Mass.
Filed June 4, 1975, Ser. No. 583,752
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—4

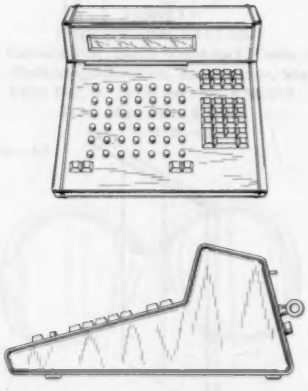


243,532
SPRAY GUN FOR WASHING VEHICLES
Billy D. Fyffe, 7423 E. 30th St., Tulsa, Okla. 74129
Filed July 21, 1975, Ser. No. 597,717
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—17



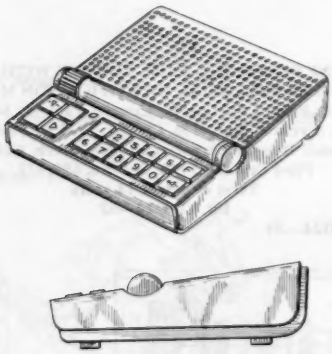
243,533
RESTAURANT BUILDING
Alvin C. Copeland, 5001 Folse Drive, Metairie, La. 70002
Filed Apr. 15, 1975, Ser. No. 568,380
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D25—25

243,534
DATA INPUT CONSOLE FOR CONSTRUCTION COST ESTIMATOR SYSTEM
John Blesch, Los Altos, Calif., assignor to Varian Associates
Filed July 16, 1975, Ser. No. 596,500
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D14—42

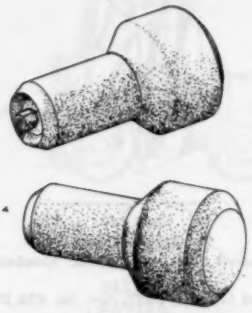


243,535
ELECTRONIC CALCULATING MACHINE
Matafumi Ikeda, Osaka, Japan, assignor to Sharp Kabushiki Kaisha (Sharp Corporation)
Filed May 21, 1976, Ser. No. 688,635
Claims priority, application Japan, Nov. 28, 1975, 50-47658
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D64—11 B

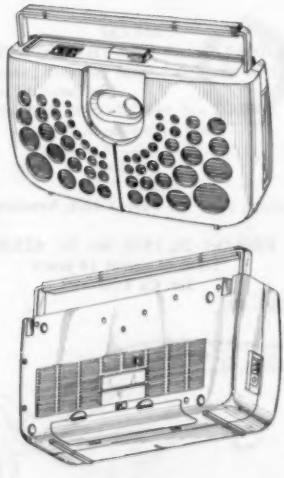
243,536
INTERCOMMUNICATION APPARATUS
Rebertus van de Poel, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Sept. 11, 1974, Ser. No. 504,913
Claims priority, application Netherlands, Mar. 13, 1974, 7458203
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—57



243,537
ELECTRONIC TRANSMITTER DEVICE FOR USE IN THE OPENING OR CLOSING OF GARAGE DOORS
John F. Wahl, Sterling, Ill., assignor to Mallard Manufacturing Corporation, Sterling, Ill.
Filed Aug. 4, 1975, Ser. No. 601,351
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—95

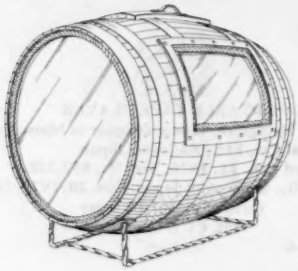


243,538
PORTABLE TAPE PLAYER
Yoichi Hisano, Neyagawa, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan
Filed Feb. 11, 1976, Ser. No. 657,328
Claims priority, application Japan, Nov. 20, 1975, 50-46226
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D14—6

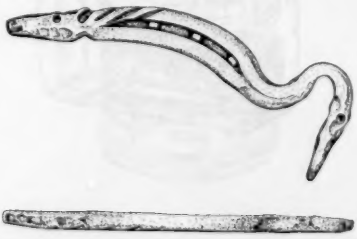


243,539
TABLE LIGHTER BASE
Robert G. Cornell, Norfolk, Mass., assignor to The Gillette Company, Boston, Mass.
Filed Nov. 12, 1975, Ser. No. 631,113
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D27—39

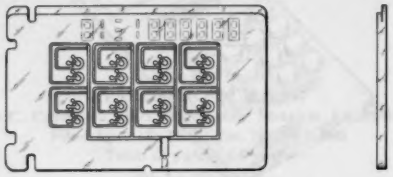
243,540
AQUARIUM
George M. Barrett, P.O. Box 2150, Hendersonville, N.C. 28739
Filed May 12, 1975, Ser. No. 576,293
Term of patent 14 years
Int. Cl. D30—*02*
U.S. Cl. D30—9



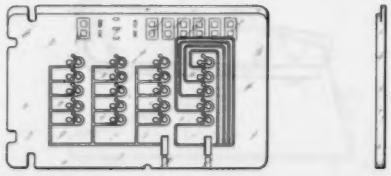
243,541
HOOF PICK
Clint C. Cullen, 2191 W. Palos Court, Newbury Park, Calif. 91320
Filed Oct. 20, 1975, Ser. No. 623,898
Term of patent 14 years
Int. Cl. D30—*99*
U.S. Cl. D30—40



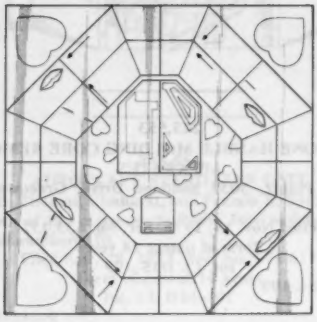
243,542
ANTIMICROBIAL SUSCEPTIBILITY CARD FOR USE WITH AN AUTOMATED MICROBIAL IDENTIFICATION MACHINE
Norman L. Fadler, St. Charles County; Paul W. Jones, and Jack R. Kirchner, both of St. Charles, all of Mo., assignors to McDonnell Douglas Corporation, Long Beach, Calif.
Filed Feb. 20, 1976, Ser. No. 659,682
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—29



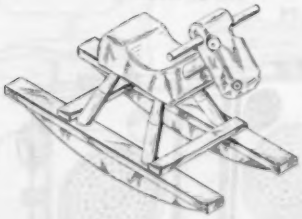
243,543
URINE SCREENING CARD FOR USE WITH AN AUTOMATED MICROBIAL IDENTIFICATION MACHINE
Norman L. Fadler, St. Charles County; Paul W. Jones, and Jack R. Kirchner, both of St. Charles, all of Mo., assignors to McDonnell Douglas Corporation, Long Beach, Calif.
Filed Feb. 20, 1976, Ser. No. 659,922
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—29



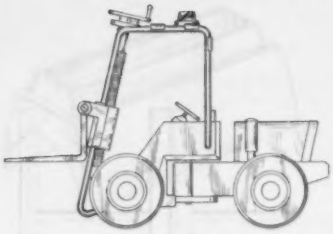
243,544
GAME BOARD
Nathan J. Hope, 1123 W. Jefferson St., Fort Wayne, Ind. 46804
Filed Sept. 11, 1975, Ser. No. 612,360
Term of patent 14 years
Int. Cl. D2—*01*
U.S. Cl. D34—5 SS



243,545
ROCKING TOY
George S. Seegers, Sr., 1239 Goodwin Ave., Charlotte, N.C. 28205
Filed Apr. 10, 1975, Ser. No. 566,938
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AE



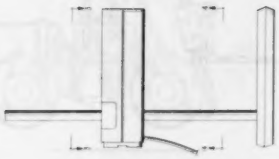
243,546
TOY FORK LIFT VEHICLE
Vernon A. Peterson, Minneapolis, Minn., assignor to Tonka Corporation, Hopkins, Minn.
Filed May 5, 1975, Ser. No. 574,261
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AJ



243,547
RATTLE
David Day, Hill Cottage, Pippingford, Nutley, Sussex, and David William Chisnall, Thirlestane, Stadhampton, Oxfordshire, both of England
Filed July 24, 1975, Ser. No. 599,940
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AG

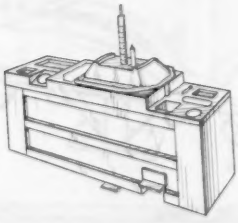
243,548
COMBINED LIGHT AND VASE STANDARD
Alton T. Shippee, Monroe, Mich., assignor to The Shippee Corporation, Monroe, Mich.
Filed Oct. 20, 1975, Ser. No. 623,603
Term of patent 14 years
Int. Cl. D26—*05*; D11—*02*
U.S. Cl. D48—20 R

243,549
DESK LAMP
René Neveux, Les Clayes-Sous-Bois, France, assignor to Societe Anonyme Francaise du Ferodo, Paris, France
Filed Jan. 29, 1976, Ser. No. 653,510
Claims priority, application France, Aug. 1, 1975, 75.74082
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—20 F

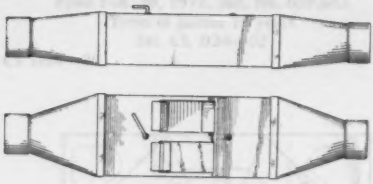


243,550
LAMP SUPPORT
Joseph Oster, Allentown, Pa., assignor to Keystone Lamp Manufacturing Corporation, Slatington, Pa.
Filed Mar. 3, 1976, Ser. No. 663,319
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—20 R

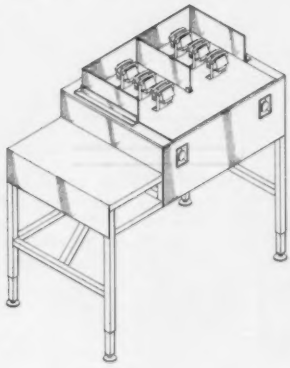
243,551
TIRE CHANGING APPARATUS OR SIMILAR ARTICLE
John F. Wood, and Charles L. Cunningham, both of Nashville, Tenn., assignors to The Coats Company, Inc., La Vergne, Tenn.
Filed Oct. 28, 1975, Ser. No. 626,076
Term of patent 14 years
Int. Cl. D15—*99*
U.S. Cl. D15—199



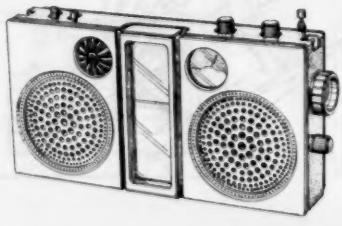
243,552
BIRD DROP STATION FOR LIVE POULTRY MOVER
Gary L. Squier, Gaylord, Minn. 55334
Filed Sept. 23, 1974, Ser. No. 508,191
Term of patent 14 years
Int. Cl. D15—*99*
U.S. Cl. D15—92



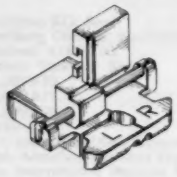
243,553
TELEPHONE HANDLE MOLDING CORE REMOVAL APPARATUS
Darrell E. Pluntz, 3039 Santiago Drive, Greenwood, Ind. 46142
Filed Nov. 19, 1975, Ser. No. 633,437
Term of patent 14 years
Int. Cl. D15—*99*
U.S. Cl. D15—199



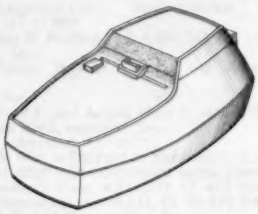
243,554
RADIO RECEIVER
Kunio Hoshino, Kadoma, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan
Filed June 18, 1975, Ser. No. 588,111
Claims priority, application Japan, Dec. 26, 1974, 50-996
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—75



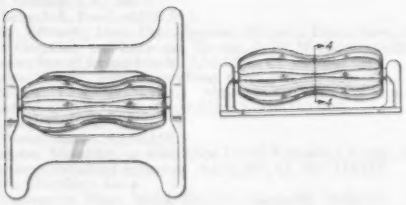
243,555
SLIDE FASTENER PRESSER FOOT
Donald G. Drew, 161 131st Ave. NE., Bellevue, Wash. 98005
Filed Aug. 30, 1974, Ser. No. 502,145
Term of patent 14 years
Int. Cl. D15—*06*
U.S. Cl. D15—72



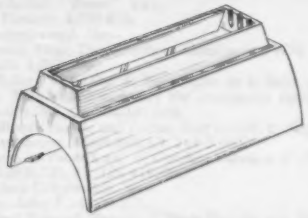
243,556
AUTOCLAVE STERILIZER UNIT
Michael D. Thomas, Elmhurst, and Francis E. Ryder, Barrington, both of Ill., assignors to Ryder International Corporation, Schaumberg, Ill.
Filed Apr. 28, 1975, Ser. No. 572,617
Term of patent 14 years
Int. Cl. D24—*01*
U.S. Cl. D24—9



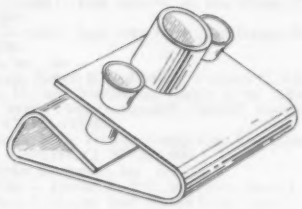
243,557
FOOT MASSAGE ROLLER
Henry A. Kientz, 34961 Avenue "A", Yucaipa, Calif. 93299
Filed Mar. 1, 1976, Ser. No. 662,501
Term of patent 14 years
Int. Cl. D28—*03*; D21—*02*
U.S. Cl. D83—1 S



243,558
DRYER ATTACHMENT
Douglas A. Long, Wilton, and Frederick A. Burke, Riverside, both of Conn., assignors to Clairol Incorporated
Filed Dec. 16, 1974, Ser. No. 533,398
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—18



243,559
STAND FOR HAIR DRYER AND CURLING IRON
James Irwin Hoyle, 2360 Trenton Drive, San Bruno, Calif. 94066, and Andre Bob Balic, 40 Chadwick Court, Millbrae, Calif. 94030
Filed Aug. 15, 1975, Ser. No. 604,917
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—38



243,560
MENU AND RECORD TITLE DISPLAY DEVICE
Kenneth P. Vogelheim, Rogers City, Mich., assignor to Ken Vogelheim Sales Co.
Filed Dec. 10, 1975, Ser. No. 639,279
Term of patent 14 years
Int. Cl. D20—*03*
U.S. Cl. D96—12 R

LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 1ST DAY OF MARCH, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. Pierburg Autogeratebau KG: *See*—
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AB Hammars Mekaniska Verkstad: *See*—
Ekholm, Rolf, 4,009,630.
Ekholm, Rolf, 4,009,631.
Ekholm, Rolf, 4,009,726.

Abate-Daga, Giancarlo: *See*—
Ravizza, Martino; and Abate-Daga, Giancarlo, 4,009,953.

Abbas, Shakir Ahmed; Anantha, Narasipur Gundappa; and Dockerty, Robert Charles, to International Business Machines Corporation. Non-volatile Schottky barrier diode memory cell. 4,010,482, Cl. 357-15.000.

Abbott Laboratories: *See*—
Hershey, Charles J., Jr.; and Lippincott, George W. (said Hershey assors. to), 4,010,299.
Johnson, Edwin Samuel; and Rippel, Riemond Henry, Jr., 4,010,261.

Abe, Kuniomi; and Maekawa, Yuji, to Konan Camera Research Institute. Binomial microscope. 4,009,526, Cl. 350-35.000.

Abe, Kuniomi; and Maekawa, Yuji, to Konan Camera Research Institute. Binomial microscope. 4,009,929, Cl. 350-35.000.

Abe, Kuniomi; and Maekawa, Yuji, to Konan Camera Research Institute. Binomial microscope. 4,009,930, Cl. 350-35.000.

Abeles, Benjamin: *See*—
Pinch, Harry Louis; Abeles, Benjamin; and Gittleman, Jonathan Isaac, 4,010,312.

Abraham, Nedumparambil A.: *See*—
Immer, Hans U.; Abraham, Nedumparambil A.; and Nelson, Verner R., 4,010,260.

Absalon, Gunter; Fischer, Konrad; and Grosholz, Rainer, to Licentia Patent-Verwaltungs-G.m.b.H. Semiconductor arrangement. 4,010,487, Cl. 357-31.000.

Ackerman, Leonard D. Roofing tool. 4,009,743, Cl. 145-1.00A.

Adachi, Yoshiaki: *See*—
Onozuka, Mitsuo; Hayashi, Yasuo; and Adachi, Yoshiaki, 4,010,141.

Adami, Hans A.: *See*—
Robbins, Richard J.; and Adami, Hans A., 4,009,909.

Adams, Capt. Allen Bond, executor: *See*—
Smith, Bob L., deceased, 4,010,471.

Adams, Charles De Witt, to Du Pont de Nemours, E. I., and Company. Compositions of alkyl 4-[o-(substituted amino)phenyl]-3-thioallophanates and methods of use. 4,010,278, Cl. 424-309.000.

Adams, Fred M. Nutcracker. 4,009,651, Cl. 99-579.000.

Addressograph Multigraph Corporation: *See*—
Jantzen, Johannes K., 4,010,478.

Adee, Raymond A., to Hesston Corporation. Windrower having shiftable tongue pivot. 4,009,554, Cl. 56-1.000.

Adlam, Christopher; and Reid, David Eric, to Burroughs Wellcome Co. Biological extracts. 4,010,257, Cl. 424-92.000.

Adler, Karl; and Strutz, Ernst, to Biviator AG. Device for measuring the ultra-violet in the uv-a and/or uv-b range. 4,010,372, Cl. 250-372.000.

AEG-Telefunken Kabelwerke AG: *See*—
Bochenek, Eduard; Heumann, Heinz; and Pohl, Viktor, 4,010,060.

Agence Nationale de Valorisation de la Recherche (ANVAR): *See*—
Metzger, Jacques V., 4,010,033.

Agency of Industrial Science & Technology: *See*—
Katsube, Yoshiyuki; and Katsube, Shizuko, 4,010,291.

AGFA-Gevaert, A.G.: *See*—
Muller, Hermann; Sandl, Dieter; Sylla, Jurgen; and Schroder, Rolf, 4,010,062.

Agnew, Paul G.; and Becker, Stephen P., to Learncom, Inc. Slide tray and tape cassette container. 4,009,781, Cl. 206-387.000.

Aher Holdings S.A.: *See*—
Beugelink, Frank, 4,009,913.

Aicher, Albrecht; Haas, Hans; Sperber, Heinrich; Diem, Hans; Matthias, Guenther; and Lehmann, Gunter, to BASF Aktiengesellschaft. Production of formaldehyde. 4,010,208, Cl. 260-603.0HF.

Ainoura, Masato. Hobbing machine. 4,009,636, Cl. 90-4.000.

Aistleitner, Olaf, to Siemens Aktiengesellschaft. Connector for shielded electric cables. 4,009,923, Cl. 339-143.00R.

Ajinomoto Co., Inc.: *See*—
Murao, Sawao, 4,010,258.

Akamatsu, Masahiko, to Mitsubishi Denki Kabushiki Kaisha. Power transistor switching apparatus. 4,010,387, Cl. 307-253.000.

Akatsu, Mitsuhiro: *See*—
Yamamoto, Hisao; Inaba, Shigeho; Hirohashi, Toshiyuki; Yamamoto, Michihiro; Ishizumi, Kikuo; Akatsu, Mitsuhiro; Maruyama, Isamu; Mori, Kazuo; Kume, Yoshiharu; and Izumi, Takahiro, 4,010,154.

Akerman, Karol; and Sauerwein, Kurt, to Sauerwein, Kurt. Device for marking fluent materials. 4,010,109, Cl. 252-301.150.

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Kura, Herbert, 4,009,676.

Akzona Incorporated: *See*—
Ramsauer, Otto; Dau, Heribert; Gumbmann, Willi; and Schulze, Ulrich, 4,010,303.

Alberny, Robert, to Institut de Recherches de la Siderurgie Francaise (IRSID). Thin-walled mold for the continuous casting of molten metal. 4,009,749, Cl. 164-147.000.

Albert, William Charles; and Zoltan, Bart Joseph, to Singer Company, The. Gyro seeker. 4,009,848, Cl. 244-3.160.

Alcidi, Mario, to Pacer S.n.C. of Cerchiai Vanna & C. Artificial pacemaker. 4,009,721, Cl. 128-419.0PG.

Alco Standard Corporation: *See*—
McCoy, John F., 4,009,872.

Aldrich, Paul Edward; Berezin, Gilbert Harvey; and Dittmar, Bruce Ivor, to Du Pont de Nemours, E. I., and Company. 1-Tertiary-alkyl-3-(substituted thienyl)ureas and 1-tertiary-alkyl-3-(substituted thietyl)ureas as antihypertensive agents. 4,009,847, Cl. 424-275.000.

Aldworth, John G.: *See*—
Wilburn, Garlington C.; Aldworth, John G.; Lugosi, Robert; and Male, Alan T., 4,010,436.

Alinder, Gilbert L.; and Anderson, Lloyd E., to Taylor Manufacturing, Inc. Carpet and tile stripper. 4,009,908, Cl. 299-37.000.

Allegheny Ludlum Industries, Inc.: *See*—
Boyer, Charles D., 4,010,042.
Choby, Edward G., Jr., 4,010,050.

Alleman, Carl E., to Phillips Petroleum Company. Process and apparatus for regenerating wet glycols. 4,010,065, Cl. 159-4.0CC.

Allen, Clayton H. Retaining fluids. 4,009,717, Cl. 128-294.000.

Allen, John L. Cooling tower blowdown heat exchange system. 4,009,577, Cl. 60-692.000.

Allen, Ralph Samuel, III. Prosthetic adapter for ski poles and the like. 4,009,496, Cl. 3-12.800.

Allied Chemical Corporation: *See*—
Jordan, James J., Jr., 4,010,162.

Allis-Chalmers Corporation: *See*—
Murray, Donald L.; Lees, John N., Jr.; and Toman, Frank W., Jr., 4,010,096.
Murray, Donald L.; Lees, John N., Jr.; and Toman, Frank W., Jr., 4,010,097.

Alpha Metals, Inc.: *See*—
Feuchtbaum, Robert B.; and Disque, Fredrick C., 4,009,816.

Alsup, James M.; and Whitehouse, Harper J., to United States of America, Navy. Carrier-compatible chirp-Z transform device. 4,010,360, Cl. 235-193.000.

Alvarez, Cesar E., Jr., to Teletype Corporation. Low power asynchronous latch. 4,010,388, Cl. 307-279.000.

American Carrier Equipment, Inc.: *See*—
Sweet, Philip J.; Hamlet, Buck C.; and Sweet, David L., 4,009,873.
Sweet, Philip J.; Hamlet, Buck C.; and Sweet, David L., 4,009,906.

American Components Inc.: *See*—
Wellard, Charles L., 4,010,440.

American Cyanamid Company: *See*—
Curran, William Vincent; Tomcufcik, Andrew Stephen; and Ross, Adma Schneller, 4,010,179.
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American Home Products Corporation: *See*—
Nudelman, Abraham; and McCaully, Ronald J., 4,010,156.
Tsuk, Andrew G., 4,010,196.

American Newspaper Publishers Association, Inc.: *See*—
Matalia, Harshad D., 4,009,841.

American Optical Corporation: *See*—
Cole, Henry B.; and Yates, Colin K., 4,010,019.
Link, William Trevor; Rugge, Henry Ferdinand; and Jansen, William David, 4,009,709.

American Pulverizer Company: *See*—
Strom, Sven B.; and Graveman, Donald F., 4,009,836.

American Tack & Hardware Co., Inc.: *See*—
Lee, Martin, 4,009,797.

Amsler, Joachim, to Sprecher & Schuh AG. Vacuum switch having axially disposed switching elements. 4,010,338, Cl. 200-144.00R.

Anaconda Company, The: *See*—
McGuire, Ronald F., 4,010,328.

Anantha, Narasipur Gundappa: *See*—
Abbas, Shakir Ahmed; Anantha, Narasipur Gundappa; and Dockerty, Robert Charles, 4,010,482.

Andersen, Bjorn A. Production of warp of textured yarns of uniform properties. 4,009,513, Cl. 28-72.600.

Anderson, John. Apparatus for trimming fat from a Boston style butt. 4,009,652, Cl. 99-590.000.

Anderson, Lloyd E.: *See*—
Alinder, Gilbert L.; and Anderson, Lloyd E., 4,009,908.

Anderson, Ray C.; and Kyle, Joseph H., to Carpets International-Georgia (Sales), Inc. Carpet tile. 4,010,301, Cl. 428-95.000.

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Anderson, Scott. Apparatus for producing halide particles. 4,010,000, Cl. 23-252.00R.

Anderson, Stanley E., Jr.: *See*—
Rohde, Robert P.; Christ, John H.; and Anderson, Stanley E., Jr., 4,009,641.

Angle, William M. Underground irrigation devices and methods of making and using the same. 4,010,298, Cl. 428-36.000.

Aoyama, Toshikazu; Okasaka, Hotuma; and Kodama, Hiroshi, to Toray Industries, Inc. Flame retardant polyester composition. 4,010,219, Cl. 260-835.000.

Apczynski, Frederick A., to Norris Industries, Inc. Wheel trim and method. 4,009,911, Cl. 301-37.0SS.

Apicella, Anthony M., Jr.; Davis, Melvin H.; and Stan, Aurel V., to Goodyear Tire & Rubber Company, The. Method and apparatus for tire identification. 4,010,354, Cl. 235-61.60R.

Apollo Chemical Corporation: *See*—
Kober, Alfred E., 4,009,605.

Applied Power Inc.: *See*—
Heinrich, Allan E., 4,009,973.

Arad, Avi; and Stephens, William. Combined shower head and dispenser. 4,009,831, Cl. 239-315.000.

Arakawa Rinsan Kagaku Kogyo Kabushiki Kaisha: *See*—
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Cardon, Bartley P.; and Frederick, Howard M., 4,010,262.

Arman, Dario. Support of the wiper blades in the windshield wiper installations on motor vehicles in general. 4,009,504, Cl. 15-250.420.

Armistead, Fontaine C., to Texaco Development Corporation. Seismic playback system. 4,010,462, Cl. 340-347.0DA.

Armour, Donald F.; and Niemi, William B., to Package Machinery Company. Injection blow molding machine having movable parison pins. 4,009,980, Cl. 425-242.00B.

Aron, Erwin, to Technical Processing, Inc. Novel processing aids for natural and synthetic rubber compounds. 4,010,129, Cl. 260-23.70M.

Asahi Kogaku Kogyo Kabushiki Kaisha: *See*—
Nobusawa, Tsukumo, 4,010,479.
Takahashi, Yasuo, 4,009,944.

Ashley, Albert H., to GTE Sylvania Incorporated. Radiation protected solid state voltage regulating apparatus. 4,010,403, Cl. 361-18.000.

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Ruf, Max; and Steinwart, Johannes, 4,009,701.

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Aviron-Violet, Paul, to Rhone-Poulenc S.A. Process for the asymmetric hydrogenation of a substituted acrylic acid or ester thereof. 4,010,181, Cl. 260-326.14T.

AVM Corporation: *See*—
Moldovan, Michael Terrance, Jr.; Lindros, Charles Jerome; Wescott, Robert Dean; Snyder, Benedict Stewart, II; Cusimano, Richard John; and Kristan, Michael, 4,010,353.

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Immer, Hans U.; Abraham, Nedumparambil A.; and Nelson, Verner R., 4,010,260.

Aylon, Norman N., to General Concrete of Canada Limited. Adhesive-applying apparatus. 4,010,203, Cl. 156-578.000.

Aysta, James E., to Minnesota Mining and Manufacturing Company. Connector. 4,009,922, Cl. 339-99.00R.

Azinger, Frederick A., Jr.: *See*—
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Baab, Albert: *See*—
Geyer, Hermann; Baab, Albert; and Himmelsbach, Paul, 4,009,946.

Baba, Hirohito. Method for sizing warp yarns. 4,009,512, Cl. 28-72.600.

Baba, Tsutomu; and Inukai, Shinpei, to Shin Meiwa Industry Co., Ltd. Apparatus for cutting an insulated wire, stripping the end thereof and twisting the wire strands. 4,009,738, Cl. 140-149.000.

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Bachman, William John: *See*—
DiMeo, Franklin Roosevelt; and Bachman, William John, 4,010,473.

Back, Frank G. Three element varifocal lens systems. 4,009,928, Cl. 350-2.000.

Badalich, Frank C.; and Pawl, George J., to Bell & Howell Company. Intermittent rotary motion device. 4,009,952, Cl. 353-109.000.

Bailer, Edmund F.; and Makdad, Albert G. Combined light and windshield wiper switch. 4,010,380, Cl. 307-10.0LS.

Bailey, John M.; Cychul, John J., Jr.; and Stratton, Michael K., to Caterpillar Tractor Co. Air purging and cooling system for internal combustion engines. 4,009,693, Cl. 123-41.82A.

Bailey, Morris W., to Overhead Door Corporation. Switch mechanism for door operator. 4,010,408, Cl. 318-266.000.

Bailey, Thomas R., to Bailey, Thomas R. Valve liner for a knife gate valve. 4,009,727, Cl. 137-454.200.

Bakker, Martinus Antonius Maria; and Klerks, Leonardus Henricus, to U.S. Philips Corporation. Method of local electroplating of strip material. 4,010,083, Cl. 204-15.000.

Balas, Jaroslav G.: *See*—
Crossland, Ronald K.; Balas, Jaroslav G.; and Bean, Arthur R., 4,010,226.

Ball Corporation: *See*—
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Ballweber, Edward G.: *See*—
Phillips, Kenneth G.; Ballweber, Edward G.; Nordquist, Karen A.; and Miller, Robert A., 4,010,131.

Bama Pie, Inc.: *See*—
Marshall, Paul W.; Singleton, Harold C.; Copp, Clyde L.; Lankford, Floyd L.; and George, Patsy L., 4,009,817.

Banas, Conrad M.; and Parasco, Aristotle, to United Technologies Corporation. Gas delivery means for cutting with laser radiation. 4,010,345, Cl. 219-121.00L.

Bandag Incorporated: *See*—
Edwards, Charles E., 4,010,052.

Bangert, Albert C. Pan for baking hamburger rolls. 4,009,859, Cl. 249-122.000.

Baram, Martin: *See*—
Zurrer, Hans; and Baram, Martin, 4,009,822.

Baranow, Sanford, to Special Metals Corporation. Process for preparing metal having a substantially uniform dispersion of hard filler particles. 4,010,024, Cl. 75-.5BC.

Barbee, Gail G., to Caterpillar Tractor Co. Disconnect and storage means for a windshield wiper arm assembly. 4,009,901, Cl. 296-28.00C.

Barber-Colman Company: *See*—
Fassell, Wayne Martin, 4,010,098.

Barmore, Thomas C. Toggle fastening device and process for its manufacture. 4,009,634, Cl. 85-3.00R.

Barnard, Walter C.; and Dahlstrom, Kenneth J., to Whirlpool Corporation. Ice maker component mounting means. 4,009,595, Cl. 62-300.000.

Barnebey-Cheney Co.: *See*—
Barnebey, Herbert L.; and Japikse, Bertrand, 4,010,014.

Barnebey, Herbert L.; and Japikse, Bertrand, to Barnebey-Cheney Co. Fluid filter with submerged passages. 4,010,014, Cl. 55-300.000.

Barracudaverken Aktiebolag: *See*—
Wallin, Erik Wilhelm, 4,010,300.

Barrett, Leo Donald; and Schram, Irwin Herbert, to Man-Gill Chemical Company. Electrocleaning method and composition. 4,010,086, Cl. 204-141.500.

Barton, George G., Jr.: *See*—
Feldman, Sidney; and Barton, George G., Jr., 4,009,960.

BASF Aktiengesellschaft: *See*—
Aicher, Albrecht; Haas, Hans; Sperber, Heinrich; Diem, Hans; Matthias, Guenther; and Lehmann, Gunter, 4,010,208.
Greif, Norbert; Vescia, Michele; Daeuble, Manfred; and Heinrich, Hans, 4,009,997.
Koenig, Horst; and Ohnsorge, Ulrich, 4,010,165.

Battelle Memorial Institute: *See*—
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Bayer Aktiengesellschaft: *See*—
Grohe, Klaus; and Frohberger, Paul-Ernst, 4,010,174.
Hofer, Wolfgang; Maurer, Fritz; Riebel, Hans-Jochem; Rohe, Lothar; and Homeyer, Bernhard, 4,010,157.
Lenz, Hans; Muschelknautz, Edgar; Herold, Heiko; Bernklau, Kurt; and Georgias, Lutz, 4,009,563.
Podschus, Ernst, 4,010,234.
Radlmann, Eduard; Schaffner, Heinz; Lorenz, Gunter; and Nischk, Gunther, 4,010,104.
Spreckelmeyer, Bernhard; Guth, Hans; Schabacher, Werner; and Rohe, Hermann, 4,010,245.
Winter, Gerhard; Mansmann, Manfred; and Zirngibl, Hans, 4,010,233.
Yamada, Yasuo; Saito, Junichi; Tamura, Tatsuo; and Kurahashi, Yoshio, 4,010,281.

Beal, Ira W., to Funk Seeds International, Inc. Pallet former. 4,009,787, Cl. 214-10.50R.

Bean, Arthur R.: *See*—
Crossland, Ronald K.; Balas, Jaroslav G.; and Bean, Arthur R., 4,010,226.

Beatty, Ronald L., to United States of America, Energy Research and Development Administration. Process for preparing metal-carbide-

containing microspheres from metal-loaded resin beads. 4,010,287, Cl. 427-6.000.

Becker, Joseph J.; Schulte-Elte, K..rl-Heinrich; Strickler, Hugo; and Ohloff, Gunther, to Firmenich S.A. Process for the preparation of a diketone derivative. 4,010,205, Cl. 260-586.00P.

Becker, Stephen P.: *See—*
Agnew, Paul G.; and Becker, Stephen P., 4,009,781.

Beckman Instruments, Inc.: *See—*
Reeves, George I.; and Keegan, Jack J., 4,010,414.
Reeves, George I.; and Chism, Hoke R., Jr., 4,010,415.
Reeves, George I.; and Richards, Donald D., 4,010,419.
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Beckman, William E.: *See—*
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Bejeannin, Desire Jean-Marie. Safety belt accessory. 4,009,905, Cl. 297-385.000.

Bell & Howell Company: *See—*
Badalich, Frank C.; and Pawl, George J., 4,009,952.
DeRosa, James, 4,010,460.
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Nupnau, Arthur E., 4,009,949.
Persha, Thomas J.; and Jagielski, David, 4,009,842.
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Bell Telephone Laboratories, Incorporated: *See—*
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Fickenscher, Hermann; and Scuderi, Rudolph, 4,010,381.
Mohsen, Amr Mohamed, 4,010,484.
Peck, Richard John, 4,010,323.

Bellew, Lawrence, to W. C. Smith & Sons, Inc. Method for forming nut cluster confections and the like. 4,010,284, Cl. 426-285.000.

Bellina, Russell F., to Du Pont de Nemours, E. I., and Company. Miticidal dithiobiurets. 4,010,199, Cl. 260-552.00R.

Beloit Corporation: *See—*
Brenner, Lawrence A.; and Scholl, Charles H., 4,009,773.

Benckiser-Knapsack GmbH: *See—*
Hoeger, Ernst; and Scholl, Margarete, 4,010,067.

Bendix Corporation, The: *See—*
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Bennett, Thomas H.; Carlow, Earl F.; Kouvoussis, Anthony E.; Orgill, Rodney H.; and Wiles, Michael F., to Motorola, Inc. Interrupt circuitry for microprocessor chip. 4,010,448, Cl. 340-172.500.

Benningfield, L. V., Jr., to Phillips Petroleum Company. Acid concentration measurement. 4,009,998, Cl. 23-230.00R.

Bense, William Malcolm, to Leesona Corporation. Winding apparatus. 4,009,839, Cl. 242-18.0DD.

Berezin, Gilbert Harvey: *See—*
Aldrich, Paul Edward; Berezin, Gilbert Harvey; and Dittmar, Bruce Ivor, 4,009,847.

Bergen, Stephen Archbold, to U.S. Philips Corporation. Atomic spectroscopy. 4,009,964, Cl. 356-85.000.

Bergwerksverband GmbH: *See—*
Degel, Josef; Karweil, Joachim; and George, Dietrich, 4,010,002.

Bernal Incorporated: *See—*
Pfaff, Paul D., 4,009,625.

Bernard, James A.; and Smith, Roy R., to General Motors Corporation. Automatic treating agent dispenser for washing appliance. 4,009,598, Cl. 68-12.00R.

Bernklau, Kurt: *See—*
Lenz, Hans; Muschelknautz, Edgar; Herold, Heiko; Bernklau, Kurt; and Georgias, Lutz, 4,009,563.

Bertelli, Guido; and Roma, Pierpaolo, to Montedison Fibre S.p.A. Self-extinguishing polyolefinic compositions. 4,010,139, Cl. 428-35.000.

Bessone, Carlo S.; and Latassa, Frank M., to GTE Sylvania Incorporated. Switching circuit for a fluorescent lamp with heated filaments. 4,010,399, Cl. 315-101.000.

Betz Laboratories, Inc.: *See—*
Swered, Paul; and Girard, Mary Anne, 4,010,277.

Beugelink, Frank, to Aher Holdings S.A. Suction nozzles for dry-fish off loading. 4,009,913, Cl. 302-58.000.

Binet, Jean Louis Christian: *See—*
Giudicelli, Don Pierre Rene Lucien; Najer, Henry; Iliesco-Branceni, Bogdan; Manoury, Philippe Michel Jacques; and Binet, Jean Louis Christian, 4,010,161.

Binks Manufacturing Company: *See—*
Krohn, Duane D.; and Culbertson, Samuel W., 4,009,971.

Binnig, Fritz; and Raschack, Manfred, to Knoll A.G. Chemische Fabriken. Anti-arrhythmic agents. 4,010,282, Cl. 424-330.000.

Binning, Jack E.: *See—*
Hanson, Paul D.; Binning, Jack E.; and Kent, Harry J., 4,009,887.

Bio-Medicus, Inc.: *See—*
Kletschka, Harold D.; Rafferty, Edson H.; and Clausen, Earl W., 4,009,719.

Birchall, James Derek; Cassidy, John Edward; Rolfe, Nicholas; and Miles, Clifford Granville, to Imperial Chemical Industries Limited. Complex phosphates. 4,010,294, Cl. 427-226.000.

BISOCA Societe de Recherches: *See—*
Courier de Mere, Henri Edouard Francois Marie, 4,009,565.

Bitterlich, Gordon M., to National Airoil Burner Company, Inc. Combination gas and oil burners. 4,009,989, Cl. 431-178.000.

Bittner, Hans-Joachim, to H. Putsch & Comp. Milling device. 4,009,637, Cl. 90-11.00B.

Biviator AG: *See—*
Adler, Karl; and Strutz, Ernst, 4,010,372.

Bjerkgard, Bjorn, to Lawrence Peska Associates, Inc., a part interest. Convertible ladder-carrier vehicle assembly. 4,009,762, Cl. 182-20.000.

Black, James B.; and Steinhagen, Horst G., to Twin Disc, Incorporated. Torque converter having adjustably movable stator vane sections and actuator means therefor. 4,009,571, Cl. 60-354.000.

Blind, James P., to Panaview Co. Front-discharge transit concrete mixer. 4,009,868, Cl. 259-172.000.

Blizzard, John D.; and Monroe, Carl M., to Dow Corning Corporation. Low durometer siloxane elastomers containing polytetrafluoroethylene powder. 4,010,136, Cl. 260-37.0SB.

Blunt, Geoffrey Vincent Dallow; Hodges, Newton John; and Pragnell, Robert James, to Coal Industry (Patents) Limited. Cellular material. 4,010,123, Cl. 260-2.50H.

Bobeck, Andrew Henry; and Danylchuk, Irynej, to Bell Telephone Laboratories, Incorporated. Magnetic bubble signal generator. 4,010,454, Cl. 340-174.0TF.

Bochenek, Eduard; Heumann, Heinz; and Pohl, Viktor, to AEG-Telefunken Kabelwerke AG. Method and apparatus for making a coaxial electric cable. 4,010,060, Cl. 156-425.000.

Boeckman, Maynard A.; and Singer, Richard M., to Kane Manufacturing Corporation. Bit key lock. 4,009,600, Cl. 70-355.000.

Boehringer Ingelheim GmbH: *See—*
Griss, Gerhart; Grell, Wolfgang; Hurnaus, Rudolf; Sauter, Robert; Eisele, Bernhard; Kaubisch, Nikolaus; and Leitold, Matyas, 4,010,279.
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Boekkooi, Anton; Hurx, Adrianus Antonius; and van Lieshout, Johannes Maria Josephus, to U.S. Philips Corporation. Electric lamp having an internal switching mechanism. 4,009,987, Cl. 431-95.00R.

Boerger, David H., to Ford Motor Company. Multiple stage expansion valve for an automotive air conditioning system. 4,009,592, Cl. 62-222.000.

Bogdanov, Alexandr Antonovich; Rodkin, Valentin Vasilievich; and Chudinovsky, Anatoly Andreevich. Submersible motor. 4,010,392, Cl. 310-87.000.

Boger, Manfred: *See—*
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Bokelmann, Horst, to Metzeler Kautschuk AG. Procedure for the production of a hollow body of rotation for coating equipment. 4,010,053, Cl. 156-154.000.

Boland, Bernard W., to Motorola, Inc. Method of fabricating an ensulated gate field-effect device. 4,010,290, Cl. 427-93.000.

Bollinger, Joseph M.; Hanauer, Richard H.; and Machleder, Warren H., to Rohm and Haas Company. Thermally labile rust inhibitors. 4,010,007, Cl. 44-71.000.

Bonanno, Frank Joseph; Kaiser, Richard B.; and Kroon, Pieter J., to Scott Paper Company. Apparatus for applying fluid to an intaglio roll for transfer to a soft, absorbent fibrous web. 4,009,657, Cl. 101-157.000.

Bonniaud, Roger; Jouan, Antoine; and Sombret, Claude, to Commissariat a l'Energie Atomique. Method for improving the incorporation of radioactive wastes into a vitreous mass. 4,009,990, Cl. 432-13.000.

Booth, Roy E., to United States of America, Navy. Modified mixing technique for carbonaceous stock. 4,010,040, Cl. 106-281.00R.

Borianne, Henri Marie Leon. Device for the teaching and/or training in the game of bridge. 4,009,522, Cl. 35-8.00B.

Bormann, Dieter; Merkel, Wulf; and Muschaweck, Roman, to Hoechst Aktiengesellschaft. 5-Sulfamoylbenzoic acid derivatives carrying a heterocyclic substituent. 4,010,273, Cl. 424-274.000.

Borsuk, Alvin; Heydn, Hans H.; and Johnson, Charles H., to Oscar Mayer & Co. Inc. Loaf mold magazine assembly. 4,009,858, Cl. 249-120.000.

Boughton, Stephen G.: *See—*
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Bourbeau, Frank J.; Meredith, Barton L.; and Rakowski, Arnold J., to General Motors Corporation. High power semiconductor device cooling apparatus and method. 4,010,489, Cl. 357-82.000.

Bouwhuis, Gijsbertus, to U.S. Philips Corporation. Apparatus for reading a record carrier in which information, for example video and/or audio information, is recorded in at least one track. 4,010,317, Cl. 358-127.000.

Bouy, Pierre: *See—*
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Bowden, James J. Manufacture of alumina for use in the basic oxygen furnace. 4,010,023, Cl. 75-3.000.

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Bowman, Robert Mathews, to Ciba-Geigy Corporation. 1,4-Oxazepines. 4,010,166, Cl. 260-333.000.

Bowthorp Hellerman Limited: *See—*
McCormick, Mathew, 4,009,509.

Boyan, Gerard E.; and Rawlings, John L., to Perkin-Elmer Corporation, The. Apparatus for enhancing visibility in fog or underwater. 4,009,948, Cl. 350-319.000.

Boyer, Charles D., to Allegheny Ludlum Industries, Inc. Process for removing phosphosilicate coatings. 4,010,042, Cl. 134-2.000.

Bozzo, Richard J.: *See—*
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Braden, Ralph S.; Stienecker, Edgar W.; and Weibel, John, Jr., to General Motors Corporation. Air conditioner air flow control mechanism. 4,009,648, Cl. 98-40.00V.

Bradt, Gordon E. Kinetic sculpture. 4,009,534, Cl. 40-106.300.
Bradt, Rexford H., to Jeffers, Albert L. Thermoplastic filament winding process. 4,010,054, Cl. 156-173.000.
Brady, Donnie G., to Phillips Petroleum Company. Phosphorus-containing flame retardant for synthetic resins. 4,010,137, Cl. 260-45.8NT.
Branham, Doud Roger: *See—*
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Brass, Ronald William; and Hansen, Harold Valentine, to Deere & Company. Planter apparatus and method for planting. 4,009,668, Cl. 111-85.000.
Braunisch, Herbert; and Lehmann, Heinz, to Hoechst Aktiengesellschaft. Plaster mixture consisting of an aqueous polymer dispersion containing pigment and filler. 4,010,134, Cl. 260-29.60S.
Breneman, Inc.: *See—*
Erpenbeck, Paul J., 4,009,745.
Brenner, Lawrence A.; and Scholl, Charles H., to Beloit Corporation. Paper roll handling apparatus. 4,009,773, Cl. 198-344.000.
Brewer, Robert W., to General Motors Corporation. Quick connect coupling. 4,009,896, Cl. 285-305.000.
Bridgestone Tire Company Limited: *See—*
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British Steel Corporation: *See—*
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Britton, Frederick G.; and Landers, Don B., to Oil States Rubber Company. Grout line protected pressure lines for setting sleeve packers. 4,009,581, Cl. 61-99.000.
Brock, Gibson E. Side-dumping slag pot carrier. 4,009,790, Cl. 214-317.000.
Broding, Robert A., to Standard Oil Company. Status display for seismometer-group recorder operations. 4,010,442, Cl. 340-15.5TS.
Brookdeal Electronics Limited: *See—*
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Brouard, Claude Marie Henri Emile; Leroy, Jean Marie Louis; and Stiot, Jean-Pierre Henry, to Produits Chimiques Ugine Kuhlmann. Water insoluble mono azo and disazo dyes containing cinnamonitrile group. 4,010,151, Cl. 260-160.000.
Broun, Thorowgood T., Jr., to PPG Industries, Inc. Removal of lead from aqueous solution using metallic magnesium. 4,010,186, Cl. 260-437.00R.
Brown, Forrest W., to Invincible Vacuum Corporation. Industrial vacuum cleaner. 4,010,015, Cl. 55-335.000.
Brown, Perry H.; and Tremblay, Maurice H., to Brunswick Corporation. Velvet fabric. 4,010,004, Cl. 29-191.600.
Brown & Williamson Tobacco Corporation: *See—*
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Brugger, Robert; Kohl, Martin; and Krause, Horst, to Langbein-Pfanhauser Werke AG. Method of and electrolytic bath for the electrodeposition of semibright nickel and nickel-cobalt coatings upon a metal surface. 4,010,084, Cl. 204-43.00T.
Brunswick Corporation: *See—*
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Buck, Elwood W., Jr., to D G Shelter Products Company. Pre-assembled unitary bay window construction. 4,009,546, Cl. 52-201.000.
Buckle, Brian Leonard. Buoyancy control apparatus for divers. 4,009,583, Cl. 61-70.000.
Bugaut, Andree: *See—*
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Bulanda, John Jean; and Schoenfeld, David Robert, to Panduit Corporation. Corner post harness assembly apparatus. 4,009,852, Cl. 248-68.00R.
Bullard, Herbert L.; and Osborn, Robert A., to Goodyear Tire & Rubber Company, The. Age resistant resin compositions and admixtures useful as adhesives. 4,010,140, Cl. 260-47.0UA.
Bungo, Edward M.; and Jack, Lloyd D., to General Motors Corporation. Spark plug connector assembly. 4,009,924, Cl. 339-223.00S.
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Burrows, Leonard H., to Westinghouse Electric Corporation. Delayed ramping in the primary control system or local maintenance controller of a gas turbine implemented electrical power plant. 4,009,567, Cl. 60-39.030.
Burstein, Albert H.; and Heiple, Kingsbury G., to Sampson Corporation, The. Fluted hip nail implant system for orthopaedic surgery. 4,009,712, Cl. 128-92.0BA.
Bysjuk, Vladimir Vladimirovich: *See—*
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Canonne, Jacques Edmond Marie, to Soreat S.A. Coating method improving preservation and enabling overtasting of confectionery articles with a base of gum arabic or similar products. 4,010,283, Cl. 426-100.000.
Capitol Products Corporation: *See—*
Schmidt, Dietrich F., 4,009,796.
Carde, Ring T.; Kochansky, Jan P.; and Roelofs, Wendell L., to Cornell Research Foundation, Inc. Sex pheromone for potato tubeworm moth, *Phthorimea operculella*. 4,010,255, Cl. 424-84.000.
Cardon, Bartley P.; and Frederick, Howard M., to Arizona Feeds. Method for reducing the incidence of scours in monogastric animals and for the treatment of scours. 4,010,262, Cl. 424-180.000.
Carl Walther Sportwaffenfabrik: *See—*
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Carlin, William W., to PPG Industries, Inc. Cathode electrocatalyst. 4,010,085, Cl. 204-128.000.
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Carpets International-Georgia (Sales), Inc.: *See—*
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Casler, William H.; and Morris, Lance. Apparatus for treating the surface of an article. 4,009,499, Cl. 15-21.00D.
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Caywood, Stanley William, Jr., to Du Pont de Nemours, E. I., and Company. Adducts containing succinic groups attached to elastomeric copolymers. 4,010,223, Cl. 260-875.000.
Cazanove, Jean, to Burroughs Corporation. Associative data processing apparatus and method. 4,010,452, Cl. 340-172.500.
Cecil Equipment Co., Inc.: *See—*
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Cecil, Shelby; and Geringer, Donald, to Cecil Equipment Co., Inc. Self-propelled tractor for welding and cutting apparatus and the like. 4,010,346, Cl. 219-125.0PL.
Celanese Corporation: *See—*
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Central Soya Company, Inc.: *See—*
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Cerberus AG: *See—*
Kopfli, Markus, 4,010,458.
Chao, Hung-Chi, to United States Steel Corporation. Apparatus for the triaxial compression of particulate material. 4,009,977, Cl. 425-78.000.

Chappell, George D.; and Stanford, James R., to Nalco Chemical Company. Corrosion inhibitor used in brines containing oxygen. 4,010,111, Cl. 252-391.000.

Charbonnier, Roger, to Ardet Electrique. Binary frequency divider for microwaves. 4,010,384, Cl. 307-220.00R.

Chateau, Louis, to Ducellier & Cie. Automatic ignition advance for an internal combustion engine. 4,009,697, Cl. 123-117.00R.

Chatham, Robert Michael, to Continental Oil Company. Reactor sampler. 4,009,618, Cl. 73-424.000.

Chelnokov, Alexandr Antonovich: *See—*
Mosse, Alfred Lvovich; Pechkovsky, Vladimir Vasilievich; Teterevkov, Anatoly Ivanovich; Burov, Igor Sergeevich; Vilk, Jury Nikolaevich; Ershov, Vadim Andreevich; Chelnokov, Alexandr Antonovich; Yasko, Oleg Iosifovich; Bysjuk, Vladimir Vladimirovich; and Dzjuba, Elena Dmitrievna, 4,010,241.

Chemed Corporation: *See—*
Tutein, Thomas R., 4,010,135.

Chernyshev, Evgeny Andreevich: *See—*
Voronkov, Mikhail Grigorievich; Deryagina, Eleonora Nikolaevna; Chernyshev, Evgeny Andreevich; Savushkina, Valentina Ivanovna; Nakhmanovich, Anatoly Samuilovich; and Tabenko, Bella Moiseevna, 4,010,210.

Chevron Research Company: *See—*
Rothert, Kenneth, 4,010,106.
Rothert, Kenneth, 4,010,107.

Chiang, Alice M.; Denley, Brian W.; and Schapker, Richard L., to Honeywell Inc. Pyroelectric detector fabrication. 4,009,516, Cl. 29-592.000.

Chihara, Machio: *See—*
Matsuo, Kotaro; Shimizu, Katsuhisa; Hoshiba, Michimasa; and Chihara, Machio, 4,010,130.

Chinn, Leland J.; and Salamon, Karlene W., to G. D. Searle & Co. (E)-4-Hydroxy-11,15-dioxoprosta-8(12),13-dien-1-oic acid γ-lactones. 4,010,169, Cl. 260-343.600.

Chinoin Gyogyszer-es Vegyeszeti Termekek Gyara RT: *See—*
Harsanyi, Kalman; Szekeres, Laszlo; Heja, Gergely; Papp, Gyula; Korbonits, Dezso; and Kiss, Pal, 4,010,193.

Chism, Hoke R., Jr.: *See—*
Reeves, George I.; and Chism, Hoke R., Jr., 4,010,415.

Choby, Edward G., Jr., to Allegheny Ludlum Industries, Inc. Processing for aluminum nitride inhibited oriented silicon steel. 4,010,050, Cl. 148-113.000.

Choi, Dai S., to Continental Oil Company. Method for preventing fluid migration in coal seams. 4,009,578, Cl. 61-36.00R.

Christ, John H.: *See—*
Rohde, Robert P.; Christ, John H.; and Anderson, Stanley E., Jr., 4,009,641.

Chudinovsky, Anatoly Andreevich: *See—*
Bogdanov, Alexandr Antonovich; Rodkin, Valentin Vasilievich; and Chudinovsky, Anatoly Andreevich, 4,010,392.

Chukyo Electric Co., Ltd.: *See—*
Higuchi, Yasuo; and Mitumura, Yosio, 4,009,644.

Ciba-Geigy AG: *See—*
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Ciba-Geigy Corporation: *See—*
Bowman, Robert Mathews, 4,010,166.
Drabek, Jozef; Boger, Manfred; and Kristiansen, Odd, 4,010,227.
Hofmann, Peter; and Rohringer, Peter, 4,010,124.
Schlaepfer, Hans, 4,009,994.
Wilhelmi, Gerhard, 4,010,275.
Wurmli, Albert, 4,009,996.

Cicatelli, Rodolfo, to Autovox S.p.A. Tape transport device. 4,010,493, Cl. 360-96.000.

Cimarusti, Christopher M.; Wojtkowski, Paul; and Dolfini, Joseph E., to E. R. Squibb & Sons, Inc. Thio-β-lactam penicillins. 4,010,175, Cl. 260-306.70C.

CKD Praha, oborovy podnik: *See—*
Kadera, Vaclav; Penkava, Jiri; and Vondruska, Miloslav, 4,009,969.

Clair, Rene; and Correia, Yves, to Produits Chimiques Pechiney-Saint Gobain. Process for the preparation of trichloroethylene. 4,010,215, Cl. 260-654.00D.

Clark, Kenneth M.: *See—*
Malsby, Marc W.; and Clark, Kenneth M., 4,009,931.

Clausen, Earl W.: *See—*
Kletschka, Harold D.; Rafferty, Edson H.; and Clausen, Earl W., 4,009,719.

Clebant, Jean-Claude; and Fecan, Jean-Claude, to Commissariat a l'Energie Atomique. Device for the study of materials subjected to alternate tensile and compressive tests. 4,009,606, Cl. 73-91.000.

Coal Industry (Patents) Limited: *See—*
Blunt, Geoffrey Vincent Dallow; Hodges, Newton John; and Pragnell, Robert James, 4,010,123.

Coats & Clark, Inc.: *See—*
Ladd, Charles Ray, 4,009,674.

Coats, John H.; Dietz, Alma; Dolak, Lester A.; Sebek, Oldrich K.; and Sokolski, Walter T., to Upjohn Company, The. Process for producing 4-thiouracil. 4,010,075, Cl. 195-80.00R.

Coca-Cola Co., The: *See—*
Sano, Namito; and Tsuchiya, Yu, 4,009,792.

Cohen, Milton J. Needle-hub assembly for syringes. 4,009,716, Cl. 128-218.0NV.

Cohen, Sabatino, to Saint-Gobain Industries. Heated windows having vacuum-deposited layers. 4,010,304, Cl. 428-213.000.

Cole, Henry B.; and Yates, Colin K., to American Optical Corporation. Method of making microchannel plates. 4,010,019, Cl. 65-36.000.

Cole, James Arlen, to Cabot Corporation. Coated tubular electrodes. 4,010,347, Cl. 219-146.000.

Colegrove, George T., to Merck & Co., Inc. Clarification of xanthan gum. 4,010,071, Cl. 195-7.000.

Coles, Donald K. Electronic musical instrument. 4,009,633, Cl. 84-1.010.

Colgate-Palmolive Company: *See—*
Hewitt, Gordon Trent, 4,010,252.

Collins, Johnny; and Heuer, Charles H., to Zenith Radio Corporation. Multi-function remote control IC. 4,010,423, Cl. 325-391.000.

Columbus McKinnon Corporation: *See—*
Schreyer, Kenneth D., 4,009,770.

Colwell, Earl J.: *See—*
Litt, Terry D.; Shelton, Richard C.; and Colwell, Earl J., 4,009,833.

Commissariat a l'Energie Atomique: *See—*
Bonniaud, Roger; Jouan, Antoine; and Sombret, Claude, 4,009,990.
Clebant, Jean-Claude; and Fecan, Jean-Claude, 4,009,606.

Concast AG: *See—*
Fekete, Kalman; and Bruderer, Werner, 4,009,750.

CONDEA Petrochemie-Gesellschaft m.b.H.: *See—*
Wassermann, Martin Wilhelm; and Meyer, Arnold Wilhelm, 4,010,247.

Contamin, Jean-Claude: *See—*
Koulbanis, Constantin; Zabotto, Arlette; and Contamin, Jean-Claude, 4,010,254.

Continental Oil Company: *See—*
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Choi, Dai S., 4,009,578.
Groves, William L., Jr., 4,010,185.
Leach, Bruce E.; and Rose, Leroy, 4,010,099.

Contone, Aurelio: *See—*
Giraldi, Pier Nicola; Nannini, Giuliano; Riasoli, Giovanni; Spelta, Anna; and Contone, Aurelio, 4,010,274.

Coon, George M. Control for forced air heating or cooling system. 4,009,825, Cl. 236-1.00E.

Coon, Herb, to Red Wing Products Inc. Garment hanger. 4,009,807, Cl. 223-96.000.

Cooper, Martin H., to Westinghouse Electric Corporation. Removal of radioactive contamination from a nuclear reactor coolant. 4,010,068, Cl. 176-37.000.

Cooper, Roydon B., to Pall Corporation. Hydrostat systems containing coaxial multidirectional flow control valves. 4,009,572, Cl. 60-454.000.

Copp, Clyde L.: *See—*
Marshall, Paul W.; Singleton, Harold C.; Copp, Clyde L.; Lankford, Floyd L.; and George, Patsy L., 4,009,817.

Cornell-Dubilier Electric Corporation: *See—*
West, Fred H., 4,010,405.
West, Fred H.; and Bowling, Edward L., 4,010,406.

Cornell Research Foundation, Inc.: *See—*
Carde, Ring T.; Kochansky, Jan P.; and Roelofs, Wendell L., 4,010,255.

Cornell, Richard D., to Sealed Power Corporation. Hydraulic lash adjuster with internal oil pressure control. 4,009,696, Cl. 123-90.350.

Corning Glass Works: *See—*
Weetall, Howard H., 4,010,076.

Correia, Yves: *See—*
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Corrosion Technical Services Limited: *See—*
Ingrey, Michael H.; and Watson, Donald J., 4,010,051.

Coruzzi, Orlando. Tape recorder drive system. 4,009,846, Cl. 242-201.000.

Cosentino, Joseph P.; and Mahn, Frederick R., to Drew Chemical Corporation. Process for dispersing contaminants in circulating water or polar organic liquid system. 4,010,110, Cl. 252-314.000.

Costa, Charles R.; and Smigel, Robert L., to Loctite Corporation. Anti-drool extrusion device. 4,009,804, Cl. 222-391.000.

Coulter, James H.: *See—*
Taber, Samuel D.; and Coulter, James H., 4,009,604.

Courier de Mere, Henri Edouard Francois Marie, to BISOCA Societe de Recherches. Time measuring device having a periodic signal generator. 4,009,565, Cl. 58-50.00R.

Couto, Luis R., to Thomas & Betts Corporation. Die set. 4,009,514, Cl. 29-751.000.

Cowley, Gerald; and Fredette, Maurice C. J., to Erco Industries Limited. Production of aqueous solutions of chlorine dioxide and chlorine. 4,010,112, Cl. 252-187.00R.

Coy, David H.: *See—*
Schally, Andrew V.; and Coy, David H., 4,010,125.

Craig, Gale M., to General Motors Corporation. Headlamp focusing method. 4,009,966, Cl. 356-123.000.

Crandall, Norman C., to Shiley Laboratories, Inc. Wedge seal for a tracheotomy tube. 4,009,720, Cl. 128-351.000.

Crandall, Richard Seely: *See—*
Faughnan, Brian Wilfred; and Crandall, Richard Seely, 4,009,935.

Crankshaw, John, to Dynetics Inc. Slip friction clutch. 4,009,771, Cl. 192-105.00A.

CRC Compagnia di Ricerca Chimica S.A.: *See—*
Kajfez, Franjo; and Sunjic, Vitomir, 4,010,153.

Croisant, Elmer E., to Brunswick Corporation. Radial thrust apparatus for high thrust trolling motor. 4,009,677, Cl. 115-18.00E.

Crossland, Ronald K.; Balas, Jaroslav G.; and Bean, Arthur R., to Shell Oil Company. Block polymers and their preparation. 4,010,226, Cl. 260-880.00B.

Culbertson, Samuel W.: *See*—
Krohn, Duane D.; and Culbertson, Samuel W., 4,009,971.

Cullen, Roy H.; Jackson, Joshua M.; and Witovek, Jim, Jr., to General Electric Company. Electrical cable feeding and removing apparatus. 4,009,754, Cl. 166-77.000.

Cunningham, Donald M., to Emerson Electric Co. Electric heating elements. 4,010,350, Cl. 219-465.000.

Cunningham, Jerry L., Sr. Bow string trigger release mechanism. 4,009,703, Cl. 124-35.00A.

Curran, William Vincent; Tomcufcik, Andrew Stephen; and Ross, Adma Schneller, to American Cyanamid Company. 1-(Para-substituted-phenyl)-1H-tetrazoles. 4,010,179, Cl. 260-308.00D.

Cushman Industries, Incorporated: *See*—
Wallace, Walter, 4,009,888.

Cusimano, Richard John: *See*—
Moldovan, Michael Terrance, Jr.; Lindros, Charles Jerome; Wescott, Robert Dean; Snyder, Benedict Stewart, II; Cusimano, Richard John; and Kristan, Michael, 4,010,353.

Cutler-Hammer, Inc.: *See*—
Hicks, Loy A., Jr.; and Welch, Franklin R., 4,009,920.

Cuzzi, Jaime R.: *See*—
Danko, Joseph O., Jr.; and Cuzzi, Jaime R., 4,010,481.

Cychul, John J., Jr.: *See*—
Bailey, John M.; Cychul, John J., Jr.; and Stratton, Michael K., 4,009,693.

D G Shelter Products Company: *See*—
Buck, Elwood W., Jr., 4,009,546.

Daellenbach, Charles B.; and Mahan, Warren M., to United States of America, Interior. Method for rapid particle size analysis by hydrosizing and nuclear sensing. 4,010,369, Cl. 250-356.000.

Daeuble, Manfred: *See*—
Greif, Norbert; Vescia, Michele; Daeuble, Manfred; and Heinrich, Hans, 4,009,997.

Dahlgrun, Rolf: *See*—
Wahle, Gunter; Dahlgrun, Rolf; and Ludszeweit, Dieter, 4,009,722.

Dahlstrom, Kenneth J.: *See*—
Barnard, Walter C.; and Dahlstrom, Kenneth J., 4,009,595.

Daniel, Donald B., to Geo-Nav, Inc. Plural frequency geological exploration system and method with phase comparison. 4,010,413, Cl. 324-6.000.

Daniel Woodhead, Inc.: *See*—
Trevithick, Tony, 4,010,336.

Danko Arlington, Inc.: *See*—
Danko, Joseph O., Jr.; and Cuzzi, Jaime R., 4,010,481.

Danko, Joseph O., Jr.; and Cuzzi, Jaime R., to Danko Arlington, Inc. Stereometric camera system. 4,010,481, Cl. 354-113.000.

Dannels, Bobby F.; and Shepard, Alvin F., to Hooker Chemicals & Plastics Corporation. Flame retardant phosphate ester derivatives of ortho novolaks. 4,010,144, Cl. 260-59.00R.

Danno, Sadao: *See*—
Mikami, Ichiro; Danno, Sadao; Uchida, Izuhiko; Tasaki, Yasutaka; Kugimoto, Junichi; and Fujitsu, Satoru, 4,010,206.

Danylchuk, Irynej: *See*—
Bobeck, Andrew Henry; and Danylchuk, Irynej, 4,010,454.

Dau, Heribert: *See*—
Ramsauer, Otto; Dau, Heribert; Gumbmann, Willi; and Schulze, Ulrich, 4,010,303.

Davey, Cyril. Liquid trap. 4,010,101, Cl. 210-86.000.

Davis, Allen: *See*—
Murley, Ellsworth M., Jr.; and Davis, Allen, 4,009,937.

Davis, Chester. Enhancement of iridescent colors to provide vivid colorants and printing inks. 4,010,293, Cl. 427-214.000.

Davis, Eugene B.: *See*—
Simmons, Raymond L.; Williams, David E.; Hoyt, Edwin D.; and Davis, Eugene B., 4,009,713.

Davis, Gary A., to Stevens-Lee Company. Refrigrated salad and salad dressing dispensing apparatus. 4,009,593, Cl. 62-250.000.

Davis, Melvin H.: *See*—
Apicella, Anthony M., Jr.; Davis, Melvin H.; and Stan, Aurel V., 4,010,354.

Davis, Royston H.; Wood, Derek A.; Rosinger, Herbert P.; and Mason, Ronald F., to Shell Oil Company. Precursors for insecticides. 4,010,190, Cl. 260-465.00D.

Davlin, Irwin H. Regulating flow. 4,009,865, Cl. 251-318.000.

Day, Lawrence, to Spitfire Tool & Machine Co., Inc. Lapping machine with vacuum workholder. 4,009,539, Cl. 51-131.000.

Dean, Malcolm Leslie; and Leary, Bruce, to Dulux Australia Ltd. Anhydride derivatives. 4,010,041, Cl. 106-287.00R.

de Aza, Salvador; Richmond, Colin; and White, James, to Gr-Stein Refractories Limited. Refractories. 4,010,039, Cl. 106-57.000.

Deere & Company: *See*—
Brass, Ronald William; and Hansen, Harold Valentine, 4,009,668.

Deering, Roland F., to Union Oil Company of California. Oil shale retorting-gasification process. 4,010,092, Cl. 208-11.00R.

DeFrees, Joseph H. Hydraulically balanced remote controlled emergency valve for storage tank. 4,009,862, Cl. 251-63.000.

Degel, Josef; Karweil, Joachim; and George, Dietrich, to Bergwerksverband GmbH. Reactor for the continuous reactivation of activated carbon particles. 4,010,002, Cl. 23-284.000.

Delmas, Richard L. Pie crust forming and trimming mold. 4,009,857, Cl. 249-102.000.

Demag Aktiengesellschaft: *See*—
Rebuschat, Karl, 4,009,869.

Demeter, James K. Moving magnet contact acoustic transducer. 4,010,334, Cl. 179-114.00M.

Dempco, Inc.: *See*—
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Denley, Brian W.: *See*—
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Denz, Paul, to Friedrich Grohe Armaturenfabrik. Pivoting discharge for sanitary flow fittings. 4,009,731, Cl. 138-37.000.

Derain, Christian, to Societe Nouvelle des Bennes Saphem. Truck dump-body operating mechanism. 4,009,791, Cl. 214-501.000.

DeRosa, James, to Bell & Howell Company. Alerting system with memory. 4,010,460, Cl. 340-311.000.

DeRosa, John A.: *See*—
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Deryagina, Eleonora Nikolaevna: *See*—
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Detjen, Robert K., to McDonough Manufacturing Company. Sawmill log-handling system. 4,009,632, Cl. 83-731.000.

Deutsch Company Electronic Components Division, The: *See*—
Malsby, Marc W.; and Clark, Kenneth M., 4,009,931.

Deutsche Gold- und Silber-Scheideanstalt vormals Roessler: *See*—
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Diamond Shamrock Corporation: *See*—
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Dickey-john Corporation: *See*—
Fathauer, George H., 4,009,799.

Didato, Thomas P. Vertical snubber shipping device. 4,009,900, Cl. 296-1.00A.

Diem, Hans: *See*—
Aicher, Albrecht; Haas, Hans; Sperber, Heinrich; Diem, Hans; Matthias, Guenther; and Lehmann, Gunter, 4,010,208.

Dietz, Alma: *See*—
Coats, John H.; Dietz, Alma; Dolak, Lester A.; Sebek, Oldrich K.; and Sokolski, Walter T., 4,010,075.

Diffenderfer, Walter L., to K-D Manufacturing Company. Spring compressor. 4,009,867, Cl. 254-10.500.

Dills, Raymond L.: *See*—
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DiMeo, Franklin Roosevelt; and Bachman, William John, to RCA Corporation. Antenna construction. 4,010,473, Cl. 343-792.500.

Dingwall, Andrew Gordon Francis; and Rosenthal, Bruce David, to RCA Corporation. Current mirror amplifier. 4,010,425, Cl. 330-35.000.

Disque, Fredrick C.: *See*—
Feuchtbaum, Robert B.; and Disque, Fredrick C., 4,009,816.

Dittmar, Bruce Ivor: *See*—
Aldrich, Paul Edward; Berezin, Gilbert Harvey; and Dittmar, Bruce Ivor, 4,009,847.

Do All Company: *See*—
Evans, Harvey M.; and Keene, Patrick V., 4,010,356.

Dockerty, Robert Charles: *See*—
Abbas, Shakir Ahmed; Anantha, Narasipur Gundappa; and Dockerty, Robert Charles, 4,010,482.

Dodd, Imrie. Missile warheads. 4,009,661, Cl. 102-61.000.

Dodington, Sven H.; and LeGrand, Jesse S., to International Telephone and Telegraph Corporation. Channel encoding for distance measurement equipment. 4,010,465, Cl. 343-5.0LS.

Doerner, William Allen; and Van Buskirk, Oral R., to Du Pont de Nemours, E. I., and Company. Regenerator for rotary Rankine cycle engines. 4,009,576, Cl. 60-669.000.

Dohi, Yuji: *See*—
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Dolak, Lester A.: *See*—
Coats, John H.; Dietz, Alma; Dolak, Lester A.; Sebek, Oldrich K.; and Sokolski, Walter T., 4,010,075.

Dolfini, Joseph E.: *See*—
Cimarusti, Christopher M.; Wojtkowski, Paul; and Dolfini, Joseph E., 4,010,175.

Dollinger, Robert E., to Phillips Petroleum Company. Carbon black pelletizing apparatus. 4,010,001, Cl. 23-252.00R.

Donau Chemie Aktiengesellschaft: *See*—
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Donnelly, James E.: *See*—
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Dor, Abraham A., to Hanna Mining Company, The. Iron oxide sorbents for sulfur oxides. 4,010,239, Cl. 423-244.000.

Douglas-Hamilton, Diarmaid H.; and Hoag, Ethan D., to Avco Everett Research Laboratory, Inc. Laser output control system. 4,010,427, Cl. 331-94.50S.

Dow Chemical Company, The: *See*—
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Mildner, Raymond C., 4,010,315.
Yonkers, Edward H.; and Harris, Wilford D., 4,009,917.

Dow Corning Corporation: *See*—
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Dowse, Brian Edward Wesley, to Golder Hoek and Associates Limited. Underwater structure. 4,009,580, Cl. 61-88.000.

Drabek, Jozef; Boger, Manfred; and Kristiansen, Odd, to Ciba-Geigy Corporation. O-alkyl-s-alkyl-o-(substituted phenyl)thiolphosphates. 4,010,227, Cl. 260-940.000.

Drake, Billy B., to Rohm and Haas Company. Free-flowing enzyme composition. 4,010,073, Cl. 195-64.000.
Draper, Frederick Gaylord. Crescendo control of signalling devices. 4,010,329, Cl. 179-84.00T.
Dravo Corporation: *See*—
Hanson, Paul D.; Binning, Jack E.; and Kent, Harry J., 4,009,887.
Dreibelbis, Richard C.; and Turner, Warren E., to Emerson Electric Co. (H & H Thermostats Div.). Dispensing head for fluid dispensing systems having elements made from plastic material. 4,009,806, Cl. 222-545.000.
Dresser Industries, Inc.: *See*—
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Dressler, Hans. Process for dyeing molded articles containing urea formaldehyde resin or melamine formaldehyde resin. 4,009,995, Cl. 8-4.000.
Drew Chemical Corporation: *See*—
Cosentino, Joseph P.; and Mahn, Frederick R., 4,010,110.
Du Pont of Canada Limited: *See*—
Harbourne, David Alan, 4,010,237.
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Duck, Sherman W., to Bell & Howell Company. Photoconductive commutators. 4,010,376, Cl. 250-578.000.
Dudek, Ronald P.: *See*—
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Dulux Australia Ltd.: *See*—
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Dunkley Company: *See*—
Lascelles, Daniel J.; and French, Dexter Spear, Jr., 4,009,650.
Dunlop Limited: *See*—
Yardley, James Frank; and Nightingale, Allen Frederick, 4,010,235.
Duperow, Donald E.; and Hughes, Norbert, to Lincoln Brass Works, Inc. Gas valve and mixing tube assembly for gas burner. 4,009,988, Cl. 431-114.000.
duPont, Anthony A. Process for the preparation of hydrogen. 4,010,249, Cl. 423-657.000.
Du Pont de Nemours, E. I., and Company: *See*—
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E. F. Houghton and Company: *See*—
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E. R. Squibb & Sons, Inc.: *See*—
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Eastman Kodak Company: *See*—
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Russin, Nicholas C.; Tershansy, Ronald A.; and Kibler, Charles J., 4,010,145.
Eckert, Konrad, to Robert Bosch G.m.b.H. Air control valve for exhaust gas purifying apparatus. 4,009,986, Cl. 431-90.000.
Edwards, Charles E., to Bandag Incorporated. Molding valve stems to rubber article. 4,010,052, Cl. 156-120.000.
Eftefield, Larry G., to Caterpillar Tractor Co. Apron lift linkage. 4,009,530, Cl. 37-126.0AD.
Eicke, Gerd, to Loesche Hartzerkleinerungs -und Zementmachinen KG. Installation and method for manufacturing cement. 4,009,992, Cl. 432-106.000.
Eickmann, Karl. Fluid-stream driven aircraft. 4,009,849, Cl. 244-53.00R.
Eisai Co., Ltd.: *See*—
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Eisele, Bernhard: *See*—
Griss, Gerhart; Grell, Wolfgang; Hurnaus, Rudolf; Sauter, Robert; Eisele, Bernhard; Kaubisch, Nikolaus; and Leitold, Matyas, 4,010,279.
Ejk, Adam J.; and Ringwood, Robert C., Jr., to M & T Chemicals Inc. Method for improving the heat stability of polyvinyl chloride. 4,010,138, Cl. 260-45.75S.
Ekholm, Rolf, to AB Hammars Mekaniska Verkstad. Device with movable end stop means for pieces of lumber to be cut into shorter pieces. 4,009,630, Cl. 83-369.000.
Ekholm, Rolf, to AB Hammars Mekaniska Verkstad. Device for holding pieces of lumber when they are cut. 4,009,631, Cl. 83-375.000.
Ekholm, Rolf, to AB Hammars Mekaniska Verkstad. Device for elongate soaking basins. 4,009,726, Cl. 134-46.000.
Elec-Tro-Tec, Inc.: *See*—
Lach, Ronald Louis, 4,010,404.
Electro-Therm, Inc.: *See*—
Salinger, Fred G., 4,010,348.
Elias, Abram G.; and Elias, Peter G. Document hanging apparatus. 4,009,784, Cl. 211-46.000.
Elias, Peter G.: *See*—
Elias, Abram G.; and Elias, Peter G., 4,009,784.
Elliott, Jennings W., to Schlumberger Technology Corporation. Methods and apparatus for recording well logging measurements. 4,010,476, Cl. 346-1.000.
Emerson Electric Co.: *See*—
Cunningham, Donald M., 4,010,350.
Emerson Electric Co. (H & H Thermostats Div.): *See*—
Dreibelbis, Richard C.; and Turner, Warren E., 4,009,806.
Emhart Industries, Inc.: *See*—
Foster, Thomas Vincent, 4,010,021.
EMI Limited: *See*—
LeMay, Christopher Archibald Gordon, 4,010,370.
LeMay, Christopher Archibald Gordon, 4,010,371.
Waites, Stephen Peter, 4,010,409.
Endo, Takaya: *See*—
Fujiwhara, Mitsuto; Endo, Takaya; and Satoh, Ryosuke, 4,010,035.
Energy and Materials Conservation Corporation: *See*—
McBride, David L., 4,010,029.
Engelhardt, Albrecht: *See*—
Koppe, Herbert; Zeile, Karl; Kummer, Werner; Stahle, Helmut; and Engelhardt, Albrecht, 4,010,158.
Engels, Uwe; Frohberg, Gunther; Klotzbach, Peter; Kuhlen, Ernst; and Rossel, Helmut, to A. Pierburg Autogeratebau KG. Control arrangement for the reconveyance of exhaust gases. 4,009,700, Cl. 123-119.00A.
Engledow, David, to British Steel Corporation. Arc furnace steelmaking. 4,010,026, Cl. 75-11.000.
English Electric Company, Limited, The: *See*—
Lorch, Hugh Olaf; and Reece, Albert Benjamin John, 4,010,393.
Lorch, Hugh Olaf; and Reece, Albert Benjamin John, 4,010,394.
Erco Industries Limited: *See*—
Cowley, Gerald; and Fredette, Maurice C. J., 4,010,112.
Ericson, Ivan Leo; and Morean, James Elroy, to GTE Sylvania Incorporated. Apparatus for maintaining vertically moving strip at established tension. 4,009,815, Cl. 226-113.000.
Erlandson, Roger S. Fletching jig. 4,009,875, Cl. 269-38.000.
Erni, Ernst R., to Hewlett-Packard Company. Low battery voltage indicator for a portable digital electronic instrument. 4,010,456, Cl. 340-248.00B.
Ernst, Arnold E. Cultivator apparatus. 4,009,759, Cl. 172-395.000.
Erpenbeck, Paul J., to Breneman, Inc. Window shade support roller and method of assembling. 4,009,745, Cl. 160-297.000.
Ershov, Vadim Andreevich: *See*—
Mosse, Alfred Lvovich; Pechkovsky, Vladimir Vasilievich; Teterevkov, Anatoly Ivanovich; Burov, Igor Sergeevich; Vilk, Jury Nikolaevich; Ershov, Vadim Andreevich; Chelnokov, Alexandr Antonovich; Yasko, Oleg Iosifovich; Bysjuk, Vladimir Vladimirovich; and Dzjuba, Elena Dmitrievna, 4,010,241.
ESB Incorporated: *See*—
Litt, Terry D.; Shelton, Richard C.; and Colwell, Earl J., 4,009,833.
Escher Wyss Limited: *See*—
Zurrer, Hans; and Baram, Martin, 4,009,822.
Essex International, Inc.: *See*—
Hirst, Paul A., 4,009,861.
Etat Francais: *See*—
Richard, Jeanne-Marie Monique, 4,010,441.
Ethyl Corporation: *See*—
Nelson, Gunner E., 4,010,187.
Nelson, Gunner E., 4,010,248.
Evans, Harvey M.; and Keene, Patrick V., to Do All Company. Tape preparation system. 4,010,356, Cl. 235-151.000.
Evans, Ronald D.: *See*—
Hartman, Thomas, Jr.; Evans, Ronald D.; and Nimmo, Bruce G., 4,009,575.
Exxon Research and Engineering Company: *See*—
Price, Roger Charles, 4,010,006.
Faber, Paul V., to Wilputte Corporation. Coke oven charging gas cleaning and collecting apparatus and process. 4,010,079, Cl. 201-4.000.
Fagan, Joseph P., to Du Pont de Nemours, E. I., and Company. Processes for impregnating and coating triaxial weave fabrics. 4,010,306, Cl. 428-236.000.
Faggin, Federico; Shima, Masatoshi; and Mazor, Stanley, to Intel Corporation. MOS computer employing a plurality of separate chips. 4,010,449, Cl. 340-172.500.
Faivre, Andre: *See*—
Tanguy, Pierre; and Faivre, Andre, 4,009,588.
Fantoni, Marco, to McClure Furniture Industries, Inc. Chipcore panel with rounded and bevelled edges overlaid with a sheet of plastic material. 4,009,916, Cl. 312-204.000.
Farha, Floyd E., Jr.: *See*—
Walker, Darrell W.; and Farha, Floyd E., Jr., 4,010,114.

Farris, George A.: *See—*
Keuchel, Herbert W.; and Farris, George A., 4,009,812.

Fassell, Wayne Martin, to Barber-Colman Company. Resource recovery from disposal of solid waste and sewage sludge. 4,010,098, Cl. 210-10.000.

Fathauer, George H., to Dickey-john Corporation. Monitor for seed planting apparatus. 4,009,799, Cl. 221-3.000.

Faughnan, Brian Wilfred; and Crandall, Richard Seely, to RCA Corporation. Electrochromic device having a dopant therein to improve its color center absorption characteristics. 4,009,935, Cl. 350-160.00R.

Faulkner, Eric Andrew, to Brookdeal Electronics Limited. Phase-sensitive detector circuit with compensation for offset error. 4,010,424, Cl. 330-9.000.

Faust, Martin H., to Penn-Dale Knitting Mills, Inc. Ventilated briefs. 4,009,495, Cl. 2-406.000.

Fay, John J., Jr. Pulse rate recorder. 4,009,708, Cl. 128-2.05P.

Fearon, Joseph G., to Morrison-Knudsen Company, Inc. Closure actuating device for railway hopper car doors. 4,009,664, Cl. 105-239.000.

Fecan, Jean-Claude: *See—*
Clebant, Jean-Claude; and Fecan, Jean-Claude, 4,009,606.

Feit, Louis: *See—*
Kivi, Aare; and Feit, Louis, 4,010,429.

Fekete, Kalman; and Bruderer, Werner, to Concast AG. Apparatus for controlling the cooling of a strand emanating from a continuous casting mold. 4,009,750, Cl. 164-154.000.

Feldman, Sidney; and Barton, George G., Jr., to United States of America, Navy. Passive optical rangefinder. 4,009,960, Cl. 356-1.000.

Fengler, Werner H. Apparatus for producing high wear-resistant composite seal. 4,009,680, Cl. 118-49.100.

Ferrentino, Antonio, to Industrie Pirelli S.p.A. Composite optical fiber element for telecommunication cables. 4,009,932, Cl. 350-96.00B.

Feuchtbaum, Robert B.; and Disque, Fredrick C., to Alpha Metals, Inc. Method and apparatus for increasing efficiency of a foam fluxer used in wave soldering of printed wiring boards. 4,009,816, Cl. 228-207.000.

Fey, Maurice G.; Kemeny, George A.; and Azinger, Frederick A., Jr., to Westinghouse Electric Corporation. Process for converting naturally occurring hydrocarbon fuels into gaseous products by an arc heater. 4,010,090, Cl. 204-170.000.

Fiber Controls Corporation: *See—*
Lytton, Kenneth G.; Miller, George J.; and Donnelly, James E., 4,009,803.

Ficken, William H., to Bendix Corporation, The. Force measuring system including combined electrostatic sensing and torquing means. 4,009,607, Cl. 73-141.00R.

Fickenscher, Hermann; and Scuderi, Rudolph, to Bell Telephone Laboratories, Incorporated. No-break AC power supply. 4,010,381, Cl. 307-66.000.

Filtrol Corporation: *See—*
Secor, Robert B.; Van Nordstrand, Robert A.; and Pegg, David R., 4,010,116.

Firester, Arthur Herbert, to RCA Corporation. Polarization-selective laser mirror. 4,009,933, Cl. 350-152.000.

Firey, Joseph Carl. Gasoline engine torque regulator with partial speed correction. 4,009,694, Cl. 123-90.120.

Firmenich S.A.: *See—*
Becker, Joseph J.; Schulte-Elte, Karl-Heinrich; Strickler, Hugo; and Ohloff, Gunther, 4,010,205.

Fischer, Eberhard: *See—*
von Plessen, Helmold; Fischer, Eberhard; and Schiessler, Siegfried, 4,010,240.

Fischer, Edgar: *See—*
Noetzel, Siegfried; Jastrow, Horst; and Fischer, Edgar, 4,010,225.

Fischer, Konrad: *See—*
Absalon, Gunter; Fischer, Konrad; and Grosholz, Rainer, 4,010,487.

Fishbein, William; Olesch, Reinhard; and Rittenbach, Otto, to United States of America, Army. Methods and apparatus for eliminating interference in radar systems. 4,010,468, Cl. 343-7.500.

Fisher, John L.: *See—*
Macemon, Herbert J.; Martin, Vance; and Fisher, John L., 4,010,437.

Fitzgerald, Robert H., to Packaging Corporation of America. Shipping container and blank therefor. 4,009,820, Cl. 229-33.000.

Fletcher, Aaron N., to United States of America, Navy. Organic nucleating agent for both warm and cold clouds. 4,009,828, Cl. 239-2.00R.

Fletcher-Terry Company, The: *See—*
Insolio, Thomas A.; Patterson, Daniel W.; and Kozyrski, Vincent T., 4,009,813.

Fletcher, Thomas A., to General Electric Company. Luminaire shield device. 4,010,362, Cl. 240-147.000.

Flowers, Dervin L., to Motorola, Inc. Molding compound containing N-methyl-Z pyrrolidone and method. 4,010,143, Cl. 260-59.0EP.

Fluoroware, Inc.: *See—*
Johnson, Douglas M., 4,009,899.

Forberg, Hans-Jurgen; Haese, Hans-Joachim; and Manz, Herbert, to Transcodan Sven Husted-Andersen. Filter for infusion and transfusion apparatus. 4,009,715, Cl. 128-214.00R.

Ford Motor Company: *See—*
Boerger, David H., 4,009,592.

Forman, George Donald, to St. Paul's Engineering Company. Control of electrical power supplies. 4,010,412, Cl. 323-18.000.

Forth, Claude A., Jr. Resilient fan hub. 4,009,970, Cl. 416-134.00R.

Foster, Thomas Vincent, to Emhart Industries, Inc. Transfer mechanism for high speed press and blow individual section glassware forming machine. 4,010,021, Cl. 65-229.000.

Fraioli, Anthony V.; and DeRosa, John A., to Plessey Incorporated. Oxidation and sinter-resistant metal powders and pastes. 4,010,025, Cl. 75-.5AC.

Frank, James P.: *See—*
Thompson, Paige W.; and Frank, James P., 4,010,337.

Frederick, Howard M.: *See—*
Cardon, Bartley P.; and Frederick, Howard M., 4,010,262.

Fredette, Maurice C. J.: *See—*
Cowley, Gerald; and Fredette, Maurice C. J., 4,010,112.

Freimuth, Gerhart William, to Gerhart Engineering and Machine Company. Piston pump. 4,009,645, Cl. 92-202.000.

French, Dexter Spear, Jr.: *See—*
Lascelles, Daniel J.; and French, Dexter Spear, Jr., 4,009,650.

French, Robert O., to Kennecott Copper Corporation. Removal of arsenic, antimony and bismuth from molten copper with sulfur hexafluoride. 4,010,030, Cl. 75-76.000.

French State, The: *See—*
Melchior, Jean F., 4,009,574.

Fresard, Marcel, to Mefina S.A. Method for making a buttonhole on a zigzag stitch sewing machine. 4,009,673, Cl. 112-264.000.

Frey, James A., to Mead Corporation, The. Head assembly for a jet drop recorder. 4,010,477, Cl. 346-75.000.

Friedrich Grohe Armaturenfabrik: *See—*
Denz, Paul, 4,009,731.

Frisque, Alvin J.: *See—*
Phillips, Kenneth G.; and Frisque, Alvin J., 4,010,231.

Frohberg, Gunther: *See—*
Engels, Uwe; Frohberg, Gunther; Klotzbach, Peter; Kuhlen, Ernst; and Rossel, Helmut, 4,009,700.

Frohberger, Paul-Ernst: *See—*
Grohe, Klaus; and Frohberger, Paul-Ernst, 4,010,174.

Frohmader, Sigrun; and Ziegler, Gunther, to Siemens Aktiengesellschaft. Method for stabilizing a superconductor. 4,010,047, Cl. 148-20.300.

Frye, Norman V. Kit for use in playing volleyball or the like. 4,009,779, Cl. 206-315.00R.

Frye, Norman V. Volleyball or like kit. 4,009,780, Cl. 206-315.00R.

Fuji Photo Film Co., Ltd.: *See—*
Hinata, Masanao; Takei, Haruo; Ikeda, Tadashi; and Iwamoto, Mitsuo, 4,010,037.

Fujii, Yuji, to Shimano Industrial Company, Limited. Caliper brake for a bicycle. 4,009,768, Cl. 188-24.000.

Fujisawa Pharmaceutical Co., Ltd.: *See—*
Kamiya, Takashi; Itoh, Masumi; and Hagiwara, Daijiro, 4,010,178.

Fujitsu, Satoru: *See—*
Mikami, Ichiro; Danno, Sadao; Uchida, Izuhiko; Tasaki, Yasutaka; Kugimoto, Junichi; and Fujitsu, Satoru, 4,010,206.

Fujiwara, Takao: *See—*
Kurita, Takaji; and Fujiwara, Takao, 4,009,958.

Fujiwhara, Mitsuto; Endo, Takaya; and Satoh, Ryosuke, to Konishiroku Photo Industry Co., Ltd. Light-sensitive silver halide color photographic material and a process for developing thereof. 4,010,035, Cl. 96-66.300.

Fukutake, Heiji: *See—*
Ohkuoo, Masahiro; and Fukutake, Heiji, 4,009,570.

Funakoshi, Satoshi: *See—*
Uemura, Yahiro; Uriyu, Katuhiro; and Funakoshi, Satoshi, 4,010,074.

Funk Seeds International, Inc.: *See—*
Beal, Ira W., 4,009,787.

Furukawa, Satoru: *See—*
Nishimura, Hiromi; Ono, Kenji; Tachibana, Katsumi; and Furukawa, Satoru, 4,010,433.

Fuwa, Jyoichi, to Ricoh Co., Ltd. Optical scanning system. 4,010,364, Cl. 250-234.000.

G. D. Searle & Co.: *See—*
Chinn, Leland J.; and Salamon, Karlene W., 4,010,169.

Gablin, Kenneth A.; and Hansen, Larry J., to Nuclear Engineering Company, Inc. Radioactive waste disposal of water containing waste using urea-formaldehyde resin. 4,010,108, Cl. 252-301.10W.

Gall, Martin, to Upjohn Company, The. [3-Substituted-5-[(dimethylamino)methyl]-4H-1,2,4-triazol-4-yl]benzophenones and process. 4,010,177, Cl. 260-308.00R.

Gauntt, Sibbley Paul, to Du Pont de Nemours, E. I., and Company. Process for drawing polyamide monofilaments. 4,009,511, Cl. 264-210.00F.

Gebhart, Charles J.; Gleim, Clyde E.; and Wiener, Maria V., to Goodyear Tire & Rubber Company, The. Polyvinyl chloride/copolyester compositions. 4,010,221, Cl. 260-873.000.

Gebr. Dickertmann Hebezeugfabric A.G.: *See—*
Hoffmann, Joachim; and Klinkhammer, Karl, 4,009,855.

Gebrueder Welger: *See—*
Sacht, Hans Otto, 4,009,653.

Gelfand, Samuel, to Hooker Chemicals & Plastics Corporation. Process for the preparation of 2,5-dichloro-p-xylene. 4,010,214, Cl. 260-650.00R.

General Binding Corporation: *See—*
Staats, Henry N.; and Newcomb, Robert K., 4,009,498.

General Concrete of Canada Limited: *See—*
Aylon, Norman N., 4,010,203.

General Electric Company: *See—*
Cullen, Roy H.; Jackson, Joshua M.; and Witovek, Jim, Jr., 4,009,754.
Fletcher, Thomas A., 4,010,362.
Harris, Samuel C., Jr.; and Hewitt, Terry L., 4,009,654.

Hester, William F., 4,009,591.
Hurko, Bohdan; and Dills, Raymond L., 4,009,795.
Klein, Keith W.; Palmieri, Joseph M.; and Lawrence, George J., 4,010,432.
Smith, William Edward, 4,010,171.
Tharpe, Bobby J.; and Graf, James C., 4,010,378.
Thompson, Paige W.; and Frank, James P., 4,010,337.
Webb, William M.; and Boughton, Stephen G., 4,009,589.
Webb, William M.; and Hester, William F., 4,009,590.
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General Motors Corporation: *See—*
Bernard, James A.; and Smith, Roy R., 4,009,598.
Bourbeau, Frank J.; Meredith, Barton L.; and Rakowski, Arnold J., 4,010,489.
Braden, Ralph S.; Stienecker, Edgar W.; and Weibel, John, Jr., 4,009,648.
Brewer, Robert W., 4,009,896.
Bungo, Edward M.; and Jack, Lloyd D., 4,009,924.
Craig, Gale M., 4,009,966.
Hetzler, Lewis R.; Huntzinger, Gerald O.; Winstead, William P., III; and Zickel, Thomas A., 4,009,699.
King, Brian P.; and Smale, Charles H., 4,009,568.
Rohde, Robert P.; Christ, John H.; and Anderson, Stanley E., Jr., 4,009,641.
Seaman, Jack L., 4,010,228.
Walters, Leslie K., 4,009,689.
Williams, Richard B., 4,009,801.

Geo-Nav, Inc.: *See—*
Daniel, Donald B., 4,010,413.

George, Dietrich: *See—*
Degel, Josef; Karweil, Joachim; and George, Dietrich, 4,010,002.

George, Patsy L.: *See—*
Marshall, Paul W.; Singleton, Harold C.; Copp, Clyde L.; Lankford, Floyd L.; and George, Patsy L., 4,009,817.

George, Richard Alexander, to U.S. Philips Corporation. Arrangement for producing free atoms of a substance for atomic spectroscopy purposes. 4,009,963, Cl. 356-85.000.

Georgias, Lutz: *See—*
Lenz, Hans; Muschelknautz, Edgar; Herold, Heiko; Bernklau, Kurt; and Georgias, Lutz, 4,009,563.

Geren, Lorenzo Dow: *See—*
Greenawalt, Eddie Lee; and Geren, Lorenzo Dow, 4,009,551.

Gerhart Engineering and Machine Company: *See—*
Freimuth, Gerhart William, 4,009,645.

Geringer, Donald: *See—*
Cecil, Shelby; and Geringer, Donald, 4,010,346.

Gerry, Martin E. Automatically retractable tape in sound-slide means. 4,010,491, Cl. 360-1.000.

Getty, Paul M.: *See—*
Munro, James M.; Ramstad, David L.; and Getty, Paul M., 4,009,635.

Geyer, Hermann; Baab, Albert; and Himmelsbach, Paul, to Jos. Schneider & Co. Optische Werke Kreuznach. Iris leaf for optical component. 4,009,946, Cl. 350-266.000.

Gilbu, Agnar, to Owens-Corning Fiberglas Corporation. Sandwich wall glass fiber reinforced construction and method of making same. 4,009,736, Cl. 138-177.000.

Gilchrist, John E. Bird perch. 4,009,686, Cl. 119-26.000.

Giraldi, Pier Nicola; Nannini, Giuliano; Riasoli, Giovanni; Spelta, Anna; and Contone, Aurelio, to Carlo Erba. Isoindoline derivatives having platelet anti-aggregating activity. 4,010,274, Cl. 424-274.000.

Girard, Mary Anne: *See—*
Swered, Paul; and Girard, Mary Anne, 4,010,277.

Gitlitz, Melvin H., to M & T Chemicals Inc. Certain triorganotin compounds used to combat mites. 4,010,276, Cl. 424-288.000.

Gittleman, Jonathan Isaac: *See—*
Pinch, Harry Louis; Abeles, Benjamin; and Gittleman, Jonathan Isaac, 4,010,312.

Giudicelli, Don Pierre Rene Lucien; Najer, Henry; Iliesco-Branceni, Bogdan; Manoury, Philippe Michel Jacques; and Binet, Jean Louis Christian, to Synthelabo. Piperazinoethyl-N-(2,3-dimethyl-5-oxo-1-phenyl-3Δ-pyrazolin-4-yl)carbamates. 4,010,161, Cl. 260-268.0PH.

Givaudan Corporation: *See—*
Naegeli, Peter, 4,010,213.

Glaser, Wolfgang; Krischke, Peter; Steinbach, Walter; and Steinmetz, Hans Joachim, to Steinmetz Krischke Systemtechnik GmbH. Mosaic printing head. 4,009,772, Cl. 197-1.00R.

Gleim, Clyde E.: *See—*
Gebhart, Charles J.; Gleim, Clyde E.; and Wiener, Maria V., 4,010,221.

Golder Hoek and Associates Limited: *See—*
Dowse, Brian Edward Wesley, 4,009,580.

Goldstein, Allan Leonard, to University of Texas System, Board of Regents of the. Purified thymosin and process. 4,010,148, Cl. 260-112.00R.

Gomez, Secundino G., to McCaffrey-Ruddock Tagline Corporation. Spring rewound tagline device with spring overload preventing means. 4,009,843, Cl. 242-107.000.

Gomez, Secundino G., to McCaffrey-Ruddock Tagline Corporation. Spring rewound tagline device having a mechanism for controlling the unwinding of the spring. 4,009,844, Cl. 242-107.300.

Goodwin, Robert M.; Klingbiel, Richard T.; and Bucher, Hermann K., to Eastman Kodak Company. Electro-optic display devices and methods. 4,009,934, Cl. 350-160.0LC.

Goodyear Tire & Rubber Company, The: *See—*
Apicella, Anthony M., Jr.; Davis, Melvin H.; and Stan, Aurel V., 4,010,354.
Bullard, Herbert L.; and Osborn, Robert A., 4,010,140.
Gebhart, Charles J.; Gleim, Clyde E.; and Wiener, Maria V., 4,010,221.
Kubinski, Donald C.; and Riggs, Robert S., 4,010,058.
Ofstead, Eilert A., 4,010,113.
Scott, Kenneth W.; and Calderon, Nissim, 4,010,224.
Wang, Jin-Liang, 4,010,305.

Gr-Stein Refractories Limited: *See—*
de Aza, Salvador; Richmond, Colin; and White, James, 4,010,039.

Graf, Carl R.: *See—*
Hahn, William F.; Graf, Carl R.; and Hart, George H., 4,009,834.

Graf, James C.: *See—*
Tharpe, Bobby J.; and Graf, James C., 4,010,378.

Graham, Douglas L.: *See—*
Setzer, William C.; Lanam, Richard D.; Winter, Joseph; and Graham, Douglas L., 4,010,046.

Grasselli, Robert K.; and Miller, Robert C., to Standard Oil Company. Catalytic conversion of saturated hydrocarbons to unsaturated products by oxidation in the presence of a halogen. 4,010,188, Cl. 260-465.00C.

Grassmann, Gunter. Precipitation detector for arrangements which control windshield wipers and/or washers, and the like. 4,010,383, Cl. 307-118.000.

Graveman, Donald F.: *See—*
Strom, Sven B.; and Graveman, Donald F., 4,009,836.

Green, Allan M. Scanning agent composition and use in imaging liver and for biliary function. 4,010,251, Cl. 424-1.500.

Green Cross Corporation, The: *See—*
Uemura, Yahiro; Uriyu, Katuhiro; and Funakoshi, Satoshi, 4,010,074.

Greenawalt, Eddie Lee; and Geren, Lorenzo Dow, to Dow Chemical Company, The. Method and apparatus for registration of web material in forming filling and sealing industrial bags. 4,009,551, Cl. 53-28.000.

Greenlee Brothers and Co.: *See—*
Linquist, Wayne A., 4,009,602.

Greenwald, Richard B., to Polaroid Corporation. Naphthalide indicator dyes. 4,010,168, Cl. 260-343.20R.

Greif, Norbert; Vescia, Michele; Daeuble, Manfred; and Heinrich, Hans, to BASF Aktiengesellschaft. Levelling auxiliaries for acid dyes. 4,009,997, Cl. 8-169.000.

Grell, Wolfgang: *See—*
Griss, Gerhart; Grell, Wolfgang; Hurnaus, Rudolf; Sauter, Robert; Eisele, Bernhard; Kaubisch, Nikolaus; and Leitold, Matyas, 4,010,279.

Gressman, Richard H. Variable rotary cutter. 4,009,626, Cl. 83-116.000.

Griffin, Phil H., III; Rehm, William A.; Talley, Martin L.; Sharki, Martin J.; and Renfro, Woodrow E., to Dresser Industries, Inc. Total gas containment system. 4,010,012, Cl. 55-169.000.

Grimsdale, Richard Lawrence: *See—*
Kibble, David John; and Grimsdale, Richard Lawrence, 4,010,451.

Grimshaw, Derald Edward, to Roe, Inc. Method and apparatus for sorting and counting fish eggs. 4,009,782, Cl. 209-73.000.

Griss, Gerhart; Grell, Wolfgang; Hurnaus, Rudolf; Sauter, Robert; Eisele, Bernhard; Kaubisch, Nikolaus; and Leitold, Matyas, to Boehringer Ingelheim GmbH. Biphenyloxy derivatives and antihyperlipidemic use. 4,010,279, Cl. 424-309.000.

Grohe, Klaus; and Frohberger, Paul-Ernst, to Bayer Aktiengesellschaft. Thiazolinone-(2)-carboxylic acid esters and process therefor. 4,010,174, Cl. 260-306.70R.

Grosholz, Rainer: *See—*
Absalon, Gunter; Fischer, Konrad; and Grosholz, Rainer, 4,010,487.

Groves, William L., Jr., to Continental Oil Company. Stable oil-soluble metal sulfonate analytical standards. 4,010,185, Cl. 260-433.000.

Gruffaz, Max; and Locatelli, Jean-Louis, to Rhone-Poulenc Industries. Curable compositions based on imide group-containing compounds. 4,010,220, Cl. 260-858.000.

Gruppo Lepetit S.p.A.: *See—*
Tarzia, Giorgio; and Panzone, Gianbattista, 4,010,159.

Gruszka, Raymond F.; and Warczyglowa, Clarence A., to Western Electric Company, Inc. Electronic apparatus with optional coupling. 4,010,488, Cl. 357-70.000.

GTE Automatic Electric Laboratories Incorporated: *See—*
Kline, Ralph LeRoy, 4,010,325.

GTE International Incorporated: *See—*
Taylor, Michael Geoffrey Cleeve; Warman, Bloomfield James; and Hackett-Jones, Francis Charles, 4,010,331.

GTE Sylvania Incorporated: *See—*
Ashley, Albert H., 4,010,403.
Bessone, Carlo S.; and Latassa, Frank M., 4,010,399.
Ericson, Ivan Leo; and Morean, James Elroy, 4,009,815.
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Gumbmann, Willi: *See—*
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Guth, Hans: *See—*
Spreckelmeyer, Bernhard; Guth, Hans; Schabacher, Werner; and Rohe, Hermann, 4,010,245.

Gutman, Arnold D., to Stauffer Chemical Company. Insecticidal active thiophene phosphorous derivatives. 4,010,263, Cl. 424-202.000.

H. Putsch & Comp.: *See—*
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Haas, Hans: *See—*
Aicher, Albrecht; Haas, Hans; Sperber, Heinrich; Diem, Hans; Matthias, Guenther; and Lehmann, Gunter, 4,010,208.

Hackett-Jones, Francis Charles: *See—*
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Haese, Hans-Joachim: *See—*
Forberg, Hans-Jurgen; Haese, Hans-Joachim; and Manz, Herbert, 4,009,715.

Haffner, Gert: *See—*
Lange, Fritz-Walter; Haffner, Gert; and Muller, Jens, 4,010,160.

Hafner, Henry F. Lubricating apparatus for conveyor chains. 4,009,764, Cl. 184-15.00A.

Hagglund, Erik Olof Sture: *See—*
Olson, Ulf Torbjorn; and Hagglund, Erik Olof Sture, 4,010,066.

Hagiwara, Daijiro: *See—*
Kamiya, Takashi; Itoh, Masumi; and Hagiwara, Daijiro, 4,010,178.

Hahn & Clay: *See—*
Pechacek, Raymond E., 4,009,798.

Hahn, William F.; Graf, Carl R.; and Hart, George H., to Pennsylvania Crusher Corporation. Method of operating breaker/crusher. 4,009,834, Cl. 241-27.000.

Hala, Alfred A., to Hohmann & Barnard, Inc. Stone structural securement system and method. 4,009,549, Cl. 52-506.000.

Hall, John B.; and Wiegers, Wilhelmus Johannen, to International Flavors & Fragrances Inc. Process for the alkylation of α, β-unsaturated aldehydes. 4,010,207, Cl. 260-601.00R.

Hall, John B.; Hruza, Denis E., Sr.; Shuster, Edward J.; Vock, Manfred Hugo; and Vinals, Joaquin Francisco, to International Flavors & Fragrances Inc. Flavorirg with 4-methyl-1-oxaspiro[5.5]undecane. 4,010,286, Cl. 426-536.000.

Hallmark, Ralph. Adjustable distal extension hinged stress breaker. 4,009,519, Cl. 32-5.000.

Hambleton, Thomas P., to International Paper Company. Hot-food transporting box. 4,009,821, Cl. 229-36.000.

Hamlet, Buck C.: *See—*
Sweet, Philip J.; Hamlet, Buck C.; and Sweet, David L., 4,009,873.
Sweet, Philip J.; Hamlet, Buck C.; and Sweet, David L., 4,009,906.

Hammer, Kurt Finn, to Johnson & Johnson; and Purolator, Inc.,. Intravenous solution filter unit. 4,009,714, Cl. 128-214.00R.

Hampton, Harvie G. Drum lifting attachment. 4,009,898, Cl. 294-31.200.

Hanauer, Richard H.: *See—*
Bollinger, Joseph M.; Hanauer, Richard H.; and Machleder, Warren H., 4,010,007.

Hanecker, John. Fixture for converting a centerless grinder to a center grinder. 4,009,538, Cl. 51-103.00C.

Hankel, Melvin C.: *See—*
Loy, John S.; Hankel, Melvin C.; and Robbins, Elmer A., 4,009,800.

Hanna Mining Company, The: *See—*
Dor, Abraham A., 4,010,239.

Hanning-Elektro-Werke Robert Hanning: *See—*
Hanning, Michael, 4,009,978.

Hanning, Michael, to Hanning-Elektro-Werke Robert Hanning. Molding system with automatic fluid treatment of mold cavity. 4,009,978, Cl. 425-98.000.

Hansen, Hans Borge: *See—*
Pontoppidan, Jorgen; Sorensen, Erik Tue; and Nielsen, Erik Kjaer, 4,010,459.

Hansen, Harold Valentine: *See—*
Brass, Ronald William; and Hansen, Harold Valentine, 4,009,668.

Hansen, Larry J.: *See—*
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Hansen, Lloyd B.; and Smarrella, Eugene R., to Carmet Company. Apparatus for roof drilling. 4,009,760, Cl. 175-320.000.

Hanson, Paul D.; Binning, Jack E.; and Kent, Harry J., to Dravo Corporation. Hydraulic press seal. 4,009,887, Cl. 277-187.000.

Harbourne, David Alan, to Du Pont of Canada Limited. Extraction of nickel from nickel-bearing ores. 4,010,237, Cl. 423-150.000.

Harris, Samuel C., Jr.; and Hewitt, Terry L., to General Electric Company. Automatic modification of the print control in a printing device. 4,009,654, Cl. 101-93.090.

Harris, Wilford D.: *See—*
Yonkers, Edward H.; and Harris, Wilford D., 4,009,917.

Harsanyi, Kalman; Szekeres, Laszlo; Heja, Gergely; Papp, Gyula; Korbonits, Dezso; and Kiss, Pal, to Chinoin Gyogyszer-es Vegyeszeti Termekek Gyara RT. Basic ester. 4,010,193, Cl. 260-473.00R.

Hart, George H.: *See—*
Hahn, William F.; Graf, Carl R.; and Hart, George H., 4,009,834.

Hartman, George D.; and Weinstock, Leonard M., to Merck & Co., Inc. Synthesis of 4-cyanothiazoles. 4,010,173, Cl. 260-302.00R.

Hartman, said Thomas L., Jr.: *See—*
Hartman, Thomas, Jr.; Evans, Ronald D.; and Nimmo, Bruce G. (said Ronald D. Evans and said Bruce G. Nimmo assors. to), 4,009,575.

Hartman, Thomas, Jr.; Evans, Ronald D.; and Nimmo, Bruce G., to Hartman, said Thomas L., Jr., by said Ronald D. Evans and said Bruce G. Nimmo. Multi-use absorption/regeneration power cycle. 4,009,575, Cl. 60-648.000.

Hastings, John A. Earlobe piercing device. 4,009,718, Cl. 128-330.000.

Hattori, Hiroyuki: *See—*
Komori, Shigehiro; Sakamaki, Hisashi; Hattori, Hiroyuki; Iida, Toshihide; Miyamoto, Koichi; and Umezawa, Kazumi, 4,009,955.

Haugen, Ronald L., to Ingersoll-Rand Company. Gas compressor. 4,010,016, Cl. 55-473.000.

Hauni-Werke Korber & Co., KG: *See—*
Wahle, Gunter; Dahlgrun, Rolf; and Ludszeweit, Dieter, 4,009,722.

Hayashi, Yasuo: *See—*
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Hayashida, Motoyuki; Wakamoto, Mutsuo; Tamura, Akinori; and Ikegami, Masafumi, to Toyo Kogyo Co., Ltd. Rotary piston type engine. 4,009,688, Cl. 123-8.090.

Hayduchok, Leon. Paint can attachment. 4,009,802, Cl. 222-108.000.

Heckman, Russell William; Nickey, George Allen; and Poole, John Edward, to Owens-Illinois, Inc. Device for automatically cleaning masks in powder coating system. 4,009,681, Cl. 118-70.000.

Heinrich, Allan E., to Applied Power Inc. Seal for hydraulic pumps and motors. 4,009,973, Cl. 418-104.000.

Heinrich, Hans: *See—*
Greif, Norbert; Vescia, Michele; Daeuble, Manfred; and Heinrich, Hans, 4,009,997.

Heiple, Kingsbury G.: *See—*
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Heja, Gergely: *See—*
Harsanyi, Kalman; Szekeres, Laszlo; Heja, Gergely; Papp, Gyula; Korbonits, Dezso; and Kiss, Pal, 4,010,193.

Hellmund, Wolfgang: *See—*
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Henkel & Cie G.m.b.H.: *See—*
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Henniger, Peter Wolfgang; and Smid, Peter Max, to Koninklijke Nederlandsche Gist-en Spiritusfabriek N.V. 7-[3-Substituted isoxazol-5-yl]-acetamido-cephalosporanic acids and their anti-bacterial use. 4,010,264, Cl. 424-246.000.

Henriksen, Carl A., to Keeler Brass Company. Backplate and bail assembly. 4,009,506, Cl. 16-126.000.

Heraeus-Schott Quarzschmelzc GmbH: *See—*
Schul, Herbert, 4,010,022.

Herman Miller, Inc.: *See—*
Wolters, Richard H.; and Stumpf, William E., 4,009,856.

Hernandez, Armando C.: *See—*
Prohoroff, Jack P., 4,009,724.

Hernqvist, Karl Gerhard, to RCA Corporation. Laser alignment system. 4,010,363, Cl. 250-201.000.

Herold, Heiko: *See—*
Lenz, Hans; Muschelknautz, Edgar; Herold, Heiko; Bernklau, Kurt; and Georgias, Lutz, 4,009,563.

Hershey, Charles J., Jr.; and Lippincott, George W., to Abbott Laboratories, by said Hershey; and Nosco, Inc., by said Lippincott. Multi-panel outsert for attachment to a container. 4,010,299, Cl. 428-44.000.

Hess, Friedrich Karl; and Stewart, Patrick Brian, to Boehringer Ingelheim GmbH. 4-Oxo-4H-pyrano[3,2-c]quinoline-2-carboxylic acids and salts thereof. 4,010,270, Cl. 424-258.000.

Hesse, Wolfgang; and Jacobi, Paul, to Hoechst Aktiengesellschaft. Phenolic resins. 4,010,163, Cl. 260-29.300.

Hesston Corporation: *See—*
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Hester, William F., to General Electric Company. Single evaporator, single fan combination refrigerator with independent temperature controls. 4,009,591, Cl. 62-180.000.

Hester, William F.: *See—*
Webb, William M.; and Hester, William F., 4,009,590.

Hetzler, Lewis R.; Huntzinger, Gerald O.; Winstead, William P., III; and Zickel, Thomas A., to General Motors Corporation. Digital ignition spark timing angle control with read only memory. 4,009,699, Cl. 123-117.00D.

Heuer, Charles H.: *See—*
Collins, Johnny; and Heuer, Charles H., 4,010,423.

Heumann, Heinz: *See—*
Bochenek, Eduard; Heumann, Heinz; and Pohl, Viktor, 4,010,060.

Heurich, Charles R., to Pamarco Incorporated. Fluid metering roll and method of making the same. 4,009,658, Cl. 101-348.000.

Hewitt, Gordon Trent, to Colgate-Palmolive Company. Antimicrobial compositions. 4,010,252, Cl. 424-47.000.

Hewitt, Terry L.: *See—*
Harris, Samuel C., Jr.; and Hewitt, Terry L., 4,009,654.

Hewlett-Packard Company: *See—*
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Heydn, Hans H.: *See—*
Borsuk, Alvin; Heydn, Hans H.; and Johnson, Charles H., 4,009,858.

Hickey, John J. Airship tankers. 4,009,850, Cl. 244-115.000.

Hicks, Clarence R., to Ball Corporation. Roof construction. 4,009,548, Cl. 52-469.000.

Hicks, Loy A., Jr.; and Welch, Franklin R., to Cutler-Hammer, Inc. Power tap-off unit for use at a single-bolt joint in a busway system. 4,009,920, Cl. 339-22.00B.

Hien, Manfred; and Schmitt, Paul, to Mannesmann Aktiengesellschaft. Roll mount for plug rolling mill. 4,009,610, Cl. 72-209.000.

High, Cliff, to Brotman, Morley. Device for dispensing portions of a chain. 4,009,627, Cl. 83-205.000.

Higuchi, Yasuo; and Mitumura, Yosio, to Chukyo Electric Co., Ltd. Rotary actuator. 4,009,644, Cl. 92-125.000.

Himmelsbach, Paul: *See—*
Geyer, Hermann; Baab, Albert; and Himmelsbach, Paul, 4,009,946.
Hinata, Masanao; Takei, Haruo; Ikeda, Tadashi; and Iwamoto, Mitsuo, to Fuji Photo Film Co., Ltd. Spectrally sensitized silver halide photographic emulsion. 4,010,037, Cl. 96-100.000.
Hinderks, Mitja Victor. Collapsible member. 4,009,622, Cl. 74-492.000.
Hirata, Nobuhiro: *See—*
Ninomiya, Tomokazu; Sasagawa, Syuzo; Washio, Hideo; and Hirata, Nobuhiro, 4,009,975.
Hirohashi, Toshiyuki: *See—*
Yamamoto, Hisao; Inaba, Shigeho; Hirohashi, Toshiyuki; Yamamoto, Michihiro; Ishizumi, Kikuo; Akatsu, Mitsuhiro; Maruyama, Isamu; Mori, Kazuo; Kume, Yoshiharu; and Izumi, Takahiro, 4,010,154.
Hirose, Ryusho, to Canon Kabushiki Kaisha. Zoom lens device. 4,009,942, Cl. 350-184.000.
Hirschfelder, Joseph O.; Lightfoot, Edwin N.; and Howard, David W., to Wisconsin Alumni Research Foundation. Hydrodynamic method for separation of solid bodies or crystals. 4,010,095, Cl. 209-132.000.
Hirst, Paul A., to Essex International, Inc. Step opening gas valve. 4,009,861, Cl. 251-61.100.
Hirt Combustion Engineers: *See—*
Hirt, John H., 4,009,985.
Hirt, John H., to Hirt Combustion Engineers. Method and apparatus for abatement of gasoline vapor emissions. 4,009,985, Cl. 431-5.000.
Ho, Chi Kuan: *See—*
Parikh, Gokaldas C.; and Ho, Chi Kuan, 4,010,250.
Ho, Ernest C., to Hughes Aircraft Company. Digital watch with liquid crystal and sequentially read out light emitting diode displays. 4,009,566, Cl. 58-50.00R.
Hoag, Ethan D.: *See—*
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Hodges, Newton John: *See—*
Blunt, Geoffrey Vincent Dallow; Hodges, Newton John; and Pragnell, Robert James, 4,010,123.
Hoechst Aktiengesellschaft: *See—*
Bormann, Dieter; Merkel, Wulf; and Muschaweck, Roman, 4,010,273.
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Roscher, Gunter; and Schmitz, Heinz, 4,010,198.
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von Plessen, Helmold; Fischer, Eberhard; and Schiessler, Siegfried, 4,010,240.
Hoeger, Ernst; and Scholl, Margarete, to Benckiser-Knapsack GmbH. Process of preventing formation of resinous deposits in the manufacture of paper and the like. 4,010,067, Cl. 162-76.000.
Hofer, Wolfgang; Maurer, Fritz; Riebel, Hans-Jochem; Rohe, Lothar; and Homeyer, Bernhard, to Bayer Aktiengesellschaft. O-alkyl-S-[1,6-dihydro-3-methyl-6-oxo-pyridazin-(1)-ylmethyl](thiono) (di)-thiol-phosphoric acid esters and ester-amides. 4,010,157, Cl. 260-250.0AP.
Hoffmann, Joachim; and Klinkhammer, Karl, to Gebr. Dickertmann Hebezeugfabric A.G. Trestle. 4,009,855, Cl. 248-352.000.
Hofmann, Peter; and Rohringer, Peter, to Ciba-Geigy Corporation. Process for flameproofing polyurethanes. 4,010,124, Cl. 260-2.5AJ.
Hofstein, Steven R., to Princeton Electronic Products, Inc. Method and system of electronic image storage and display. 4,010,466, Cl. 343-5.0SC.
Hohmann & Barnard, Inc.: *See—*
Hala, Alfred A., 4,009,549.
Holgado, Rosauro V., to E. F. Houghton and Company. Oil-in-water emulsion hydraulic fluid. 4,010,105, Cl. 252-77.000.
Hollander, James Fisher. Apparatus for simulation of interpersonal relationships and activity. 4,009,525, Cl. 35-22.00R.
Hollister, Donald D. Light generation by an electrodeless fluorescent lamp. 4,010,400, Cl. 315-248.000.
Holz, George E., to Burroughs Corporation. Gas discharge display panel with cell-firing means having glow spreading electrode. 4,010,395, Cl. 313-188.000.
Homeyer, Bernhard: *See—*
Hofer, Wolfgang; Maurer, Fritz; Riebel, Hans-Jochem; Rohe, Lothar; and Homeyer, Bernhard, 4,010,157.
Hon, David T., to Hughes Aircraft Company. Flashlamp triggering arrangements for pressurized gas cooled lasers. 4,010,397, Cl. 315-57.000.
Honeywell Inc.: *See—*
Chiang, Alice M.; Denley, Brian W.; and Schapker, Richard L., 4,009,516.
Honeywell Information Systems, Inc.: *See—*
Olney, Frederick D., Jr.; and Rich, Dennis E., 4,009,683.
Porter, Marion G.; Patterson, Garvin Wesley; and Calle, Jaime, 4,010,450.
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Honnert, Quentin E.: *See—*
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Hood, Clarence Francis, to Top Roc Precast Corporation. Precast monument base. 4,009,547, Cl. 52-294.000.
Hoogeveen, Frank, to Maschinenfabrik Augsburg-Nurnberg AG. Detachable connection between two electric conductors. 4,009,925, Cl. 339-273.00R.
Hooker Chemicals & Plastics Corporation: *See—*
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Horikoshi, Hiroyashi: *See—*
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Horimoto, Mitsuaki, to Minolta Camera Kabushiki Kaisha. Fish eye lens system. 4,009,943, Cl. 350-207.000.
Horn, Robert E. Barbering tool. 4,009,517, Cl. 30-30.000.
Horner, Joseph L., to United States of America, Transportation. Analog visibility computer. 4,010,357, Cl. 235-151.300.
Hoshiba, Michimasa: *See—*
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Hoshino, Yukio, to Nippon Electric Company, Ltd. Word recognition apparatus. 4,010,445, Cl. 340-146.3WD.
Houck, Theodore B., to Parker Drilling Company, Inc. Drilling rig with improved mast support structure. 4,009,544, Cl. 52-120.000.
Houston, Alvin J., to Hutton Developments Ltd. Footings and foundations for building. 4,009,542, Cl. 52-73.000.
Howard, David W.: *See—*
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Howell, Duane Aaron, to Kartridg Pak Co., The. Dual compartment package and method for making same. 4,009,778, Cl. 206-219.000.
Howmedica, Inc.: *See—*
Tesk, John A.; Severa, Henrietta M.; Dudek, Ronald P.; and Kosmos, Peter, 4,010,048.
Howorth Air Engineering Limited: *See—*
Howorth, Frederick Hugh, 4,009,647.
Howorth, Frederick Hugh, to Howorth Air Engineering Limited. Clean air zone for surgical purposes. 4,009,647, Cl. 98-36.000.
Hoyt, Edwin D.: *See—*
Simmons, Raymond L.; Williams, David E.; Hoyt, Edwin D.; and Davis, Eugene B., 4,009,713.
Williams, David E.; and Hoyt, Edwin D., 4,010,351.
Hruza, Denis E., Sr.: *See—*
Hall, John B.; Hruza, Denis E., Sr.; Shuster, Edward J.; Vock, Manfred Hugo; and Vinals, Joaquin Francisco, 4,010,286.
Hubbard, S. Eugene, to Kawneer Company, Inc. Automatic astragal. 4,009,537, Cl. 49-319.000.
Hudson Lock, Inc.: *See—*
Patriquin, George P., 4,009,599.
Hughes Aircraft Company: *See—*
Ho, Ernest C., 4,009,566.
Hon, David T., 4,010,397.
Meyers, Franklin J.; and Sturiale, Gino R., 4,010,365.
Zurcher, Rudolf F., 4,009,564.
Hughes, Norbert: *See—*
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Hughey, Emerson Dee. Propeller making apparatus. 4,009,874, Cl. 269-3.000.
Hunter, Alex E. Pole ladder. 4,009,763, Cl. 182-187.000.
Huntzinger, Gerald O.: *See—*
Hetzler, Lewis R.; Huntzinger, Gerald O.; Winstead, William P., III; and Zickel, Thomas A., 4,009,699.
Hurko, Bohdan; and Dills, Raymond L., to General Electric Company. Combined reflector pan and trim ring. 4,009,795, Cl. 220-64.000.
Hurlock, John R.; and Phillips, Kenneth G., to Nalco Chemical Company. Purification of acrylamide via crystallization with centrifugal liquor separation. 4,010,142, Cl. 260-561.00N.
Hurnaus, Rudolf: *See—*
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Hutton Developments Ltd.: *See—*
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I D F Company Ltd.: *See—*
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Ichihashi, Hiroshi: *See—*
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Ishammar, Nils Gosta Sigvard, 4,010,341.
Ihms, James E. Apparatus for stereoscopic photography. 4,009,951, Cl. 353-7.000.
Iida, Toshihide: *See—*
Komori, Shigehiro; Sakamaki, Hisashi; Hattori, Hiroyuki; Iida, Toshihide; Miyamoto, Koichi; and Umezawa, Kazumi, 4,009,955.
Iizuka, Haruhiko: *See—*
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Iizuka, Yutaka: *See—*
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Ikeda Bussan Co., Ltd.: *See—*
Oka, Takashi; Iwasaki, Hiroshi; and Kato, Eiichi, 4,010,055.
Ikeda, Tadashi: *See—*
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Ikegami, Masafumi: *See—*
Hayashida, Motoyuki; Wakamoto, Mutsuo; Tamura, Akinori; and Ikegami, Masafumi, 4,009,688.
Iler, Ralph K.; and McQueston, Herbert J., to Du Pont de Nemours, E. I., and Company. Uniform oxide microspheres and a process for their manufacture. 4,010,242, Cl. 423-335.000.
Iliesco-Branceni, Bogdan: *See—*
Giudicelli, Don Pierre Rene Lucien; Najer, Henry; Iliesco-Branceni, Bogdan; Manoury, Philippe Michel Jacques; and Binet, Jean Louis Christian, 4,010,161.
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IMC Chemical Group, Inc.: *See—*
Young, Vernon V.; Kosewicz, John S.; and Schmitz, Frederick William, 4,010,167.
Immer, Hans U.; Abraham, Nedumparambil A.; and Nelson, Verner R., to Ayerst McKenna & Harrison Ltd. Derivatives of retro-enantio-somatostatin, intermediates therefor, and process therefor. 4,010,260, Cl. 424-177.000.
Imperial Chemical Industries Limited: *See—*
Birchall, James Derek; Cassidy, John Edward; Rolfe, Nicholas; and Miles, Clifford Granville, 4,010,294.
McLoughlin, Bernard Joseph; and Guildford, Allen John, 4,010,266.
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Yamamoto, Hisao; Inaba, Shigeho; Hirohashi, Toshiyuki; Yamamoto, Michihiro; Ishizumi, Kikuo; Akatsu, Mitsuhiro; Maruyama, Isamu; Mori, Kazuo; Kume, Yoshiharu; and Izumi, Takahiro, 4,010,154.
Inada, Nichimu. Electromassager. 4,009,710, Cl. 128-44.000.
Industrie Pirelli S.p.A.: *See—*
Ferrentino, Antonio, 4,009,932.
Ing. C. Olivetti & C., S.p.A.: *See—*
Ravizza, Martino; and Abate-Daga, Giancarlo, 4,009,953.
Ingersoll-Rand Company: *See—*
Haugen, Ronald L., 4,010,016.
Ingrey, Michael H.; and Watson, Donald J., to Corrosion Technical Services Limited. Bedding of load-carrying members on load-supporting foundations. 4,010,051, Cl. 156-71.000.
Inoue, Takao: *See—*
Miura, Takashi; Terada, Hideto; Inoue, Takao; and Kubota, Hironobu, 4,009,747.
Inouye, Shigeharu; Shomura, Takashi; Kojima, Michio; Ogawa, Yasuaki; Watanabe, Hiroshi; Kondo, Yasumitsu; Saito, Kazuo, deceased (by Saito, Nobuko, administratrix); Yamada, Yujiro; and Niida, Taro, to Meiji Seika Kaisha, Ltd. Antibiotic SF-1623 substance. 4,010,155, Cl. 260-243.00C.
Insolio, Thomas A.; Patterson, Daniel W.; and Kozyrski, Vincent T., to Fletcher-Terry Company, The. Apparatus for cracking plastic sheet. 4,009,813, Cl. 225-103.000.
Institut de Recherches de la Siderurgie Francaise (IRSID): *See—*
Alberny, Robert, 4,009,749.
Intel Corporation: *See—*
Faggin, Federico; Shima, Masatoshi; and Mazor, Stanley, 4,010,449.
Interatom, Internationale Atomreaktorbau GmbH: *See—*
Lohnert, Gunter; and Muller-Frank, Ulrich, 4,010,070.
International Business Machines Corporation: *See—*
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Invincible Vacuum Corporation: *See—*
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Ionescu, Istrate. Watt hour meter. 4,010,417, Cl. 324-94.000.
Iowa State University Research Foundation, Inc.: *See—*
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Irwin, Donald A., Sr.; Madge, Gordon H.; Kloss, Charles F.; and Stone, Allen L., to Uniroyal Inc. Bonded calcium carbide article and method for making the same. 4,010,028, Cl. 75-53.000.
Ishammar, Nils Gosta Sigvard, to IFO Kampri AB. Hot air oven. 4,010,341, Cl. 219-400.000.
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Iwasaki, Hiroshi: *See—*
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Jarvstrat, Nils Goran. Liquid treatment apparatus having parallel rotating baffles. 4,010,102, Cl. 210-151.000.
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Jeter, John D. Apparatus and method for indicating at the surface the measurement of a downhole condition. 4,009,613, Cl. 73-155.000.
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Jo, Hong-Kyu, to UOP Inc. Substituted natural gas via hydrocarbon steam reforming. 4,010,008, Cl. 48-214.00A.
Johansson, J. A. Olof. Disinfectants containing iodine complexed to a hydrophilic organic carrier. 4,010,259, Cl. 424-150.000.

Johnson, Charles H.: *See*—
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Johnson, David Emil, to Mobil Oil Corporation. Apparatus for producing a foamed polystyrene sheet having a density gradient decreasing from the external surfaces inwardly. 4,009,976, Cl. 425-68.000.
Johnson, Douglas M., to Fluoroware, Inc. Wafer tongs. 4,009,899, Cl. 294-33.000.
Johnson, Edwin Samuel; and Rippel, Riemond Henry, Jr., to Abbott Laboratories. Method to prevent reproduction with [Des-Gly]^{10}-GN-RH nonadeptide amide analogs in position. 4,010,261, Cl. 424-177.000.
Johnson, James A. Wheel balancer. 4,009,612, Cl. 73-480.000.
Johnson & Johnson: *See*—
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Johnson, Julius Theodore. On-line liquid samplers. 4,009,617, Cl. 73-422.0TC.
Johnson, Lawrence M. Grading blade for a toothed shovel. 4,009,529, Cl. 37-117.500.
Jolly, David C.; and King, Daniel J., to Massachusetts Institute of Technology. High voltage electrical insulator having magnetic elements to prevent flashover. 4,010,316, Cl. 174-140.00R.
Jones, Howard S., Jr., to United States of America, Army. Multi-function integrated radome-antenna system. 4,010,470, Cl. 343-708.000.
Jones, James E.: *See*—
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Joyal Products, Incorporated: *See*—
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Kadera, Vaclav; Penkava, Jiri; and Vondruska, Miloslav, to CKD Praha, oborovy podnik. Supporting ring for stator vanes in an axial compressor. 4,009,969, Cl. 415-217.000.
Kai, Toshio: *See*—
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Kaiser, Richard B.: *See*—
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Kajfez, Franjo; and Sunjic, Vitomir, to CRC Compagnia di Ricerca Chimica S.A. Preparation of chiral 1,4-benzodiazepin-2-one-derivatives by reaction of (s)-α-amino acid chloride hydrochlorides etc. 4,010,153, Cl. 260-239.30D.
Kalman, Peter Gabor. Method of using multiple stressed sealing plugs to filter polymeric material. 4,010,391, Cl. 210-71.000.
Kalopissis, Gregoire; and Bugaut, Andree, to Societe Anonyme dite: L'Oreal. N,N-diaryl alkylenediamine oxidation dye compounds. 4,010,200, Cl. 260-570.50P.
Kamiya, Takashi; Itoh, Masumi; and Hagiwara, Daijiro, to Fujisawa Pharmaceutical Co., Ltd. Carbonic acid esters, and the preparation thereof and their use. 4,010,178, Cl. 260-308.00B.
Kanbe, Masaru: *See*—
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Kantor, Frederick W. Rotary thermodynamic apparatus and method. 4,010,018, Cl. 62-499.000.
Kanzaki Paper Manufacturing Co., Ltd.: *See*—
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Kato, Tetsuji, to Mitsubishi Rayon Co., Ltd. System for cutting pieces from a traveling strip of sheet material. 4,009,628, Cl. 83-294.000.
Katsube, Shizuko: *See*—
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Katsube, Yoshiyuki; and Katsube, Shizuko, to Agency of Industrial Science & Technology. Method of making a low resistance indium oxide conductive film. 4,010,291, Cl. 427-126.000.
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Kawakita, Hiroaki; and Morita, Shigeru, to Kubota, Ltd. Device for connecting working implement to tractor. 4,009,890, Cl. 280-467.000.
Kawasaki Jukogyo Kabushiki Kaisha: *See*—
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Kay, Robert M., to United States of America, Air Force. Phase locked loop resolver to digital converter. 4,010,463, Cl. 340-347.0SY.
Kay, Thomas D. Patient restraining device for the pinhole collimator and gamma scintillation camera. 4,010,373, Cl. 250-456.000.
Kayabakogyo-Kabushiki-Kaisha: *See*—
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Keddeinis, Heinrich; and Wunnenberg, Klaus, to Mannesmann Aktiengesellschaft. Method of starting continuous casting. 4,009,748, Cl. 164-73.000.
Keegan, Jack J.: *See*—
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Keene, Patrick V.: *See*—
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Keller, Alex Jacques. Apparatus for positioning bales within a bale assembly area. 4,009,663, Cl. 104-1.00R.
Kemeny, George A.: *See*—
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Keuchel, Herbert W.; and Farris, George A., to PNC Corporation. Fibrillator. 4,009,812, Cl. 225-97.000.
Kibble, David John; and Grimsdale, Richard Lawrence, to National Research Development Corporation. Data structure processor. 4,010,451, Cl. 340-172.500.
Kibler, Charles J.: *See*—
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Kikuchi, Shintaro: *See*—
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King, Arthur Shelley. Hypochlorite production. 4,010,244, Cl. 423-473.000.
King, Brian P.; and Smale, Charles H., to General Motors Corporation. Turbine support structure. 4,009,568, Cl. 60-39.320.
King, Daniel J.: *See*—
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King, John E.; and Watkins, Herbert W., to Singer Company, The. Interconnected response recording and display consoles. 4,009,521, Cl. 35-8.00R.
Kircher, John G. Display for a simulated football game. 4,009,679, Cl. 116-120.000.
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Kivi, Aare; and Feit, Louis, to International Telephone and Telegraph Corporation. Coaxial disc-junction power divider. 4,010,429, Cl. 333-9.000.
Klein, Keith W.; Palmieri, Joseph M.; and Lawrence, George J., to General Electric Company. Electrical receptacle equipped with ground fault protection. 4,010,432, Cl. 335-18.000.
Klein, Walter. Microscope objective. 4,009,945, Cl. 350-215.000.
Klerks, Leonardus Henricus: *See—*
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Kletschka, Harold D.; Rafferty, Edson H.; and Clausen, Earl W., to Bio-Medicus, Inc. Protective cover for suture bridge. 4,009,719, Cl. 128-335.000.
Kliment, Karel; Vermes, Rudolf N.; and Stockel, Richard F., to National Patent Development Corporation. Water soluble polymers useful in the preparation of novel animal litter. 4,009,684, Cl. 119-1.000.
Kline, Ralph LeRoy, to GTE Automatic Electric Laboratories Incorporated. Framing circuit for digital signals using evenly spaced alternating framing bits. 4,010,325, Cl. 179-15.0BS.
Klingbiel, Richard T.: *See—*
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Klygis, Mindaugas Julius; and Weaver, William Norfred, to Illinois Tool Works Inc. Pour spout. 4,009,805, Cl. 222-530.000.
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Knowles, Robert Gordon, to Litton Systems, Inc. Spiral crimp for retaining a wire conductor in a metal contact. 4,009,927, Cl. 339-276.00T.
Kobayashi, Yukio; Sakimoto, Seiitiro; and Tanaka, Nobuyoshi, to Showa Denko Kabushiki Kaisha. Method of manufacturing synthetic resin film having high writability and printability. 4,010,289, Cl. 427-54.000.
Kober, Alfred E., to Apollo Chemical Corporation. Method for determining T_{350} temperature. 4,009,605, Cl. 73-56.000.
Kobrinetz, Anthony, to Motorola, Inc. Communication system interface circuit. 4,010,327, Cl. 179-41.00A.
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Koenig, Horst; and Ohnsorge, Ulrich, to BASF Aktiengesellschaft. Manufacture of thiophen-3-aldehyde. 4,010,165, Cl. 260-332.30R.
Koffer, George Warren; and Branham, Doud Roger, to Oxford Laboratories Inc. Hand-held micropipettor with improved pipette tip ejector. 4,009,611, Cl. 73-425.600.
Kohashi, Tadao, to Matsushita Electric Industrial Co., Ltd. Light modulating device using Schlieren lens system. 4,010,321, Cl. 358-233.000.
Kohaut, John E., to Raceway Components, Inc. Insert device for cables. 4,010,314, Cl. 174-48.000.
Kohl, Martin: *See—*
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Konan Camera Research Institute: *See—*
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Kools, Franciscus Xaverius Nicolaus Maria, to U.S. Philips Corporation. Radially anisotropic magnet body. 4,010,434, Cl. 335-302.000.
Kopfli, Markus, to Cerberus AG. Light gate system. 4,010,458, Cl. 340-258.00R.
Koppe, Herbert; Zeile, Karl; Kummer, Werner; Stahle, Helmut; and Engelhardt, Albrecht, to Boehringer Ingelheim GmbH. 1-(2'-Ethynyl-phenoxy)-2-hydroxy-3-butylamino-propanes and salts. 4,010,158, Cl. 260-253.000.
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Korthals, John G. Roughage feeder unit. 4,009,687, Cl. 119-51.00R.
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Koster, Roland; and Pourzal, Ali-Akbar, to Studiengesellschaft Kohle m.b.H. Process for preparing condensation products. 4,010,204, Cl. 260-586.00C.
Koulbanis, Constantin; Zabotto, Arlette; and Contamin, Jean-Claude, to Societe Anonyme dite: L'Oreal. Gels based on vinyl ether-maleic anhydride copolymer neutralized by a basic amino acid. 4,010,254, Cl. 424-78.000.
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Kozyrski, Vincent T.: *See—*
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Kramer & Grebe GmbH & Co. KG Maschinen-und Modellfabrik: *See—*
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Krohn, Duane D.; and Culbertson, Samuel W., to Binks Manufacturing Company. Electric motor-driven, double-acting pump having pressure-responsive actuation. 4,009,971, Cl. 417-43.000.
Krol, William S., to Teletype Corporation. Multiplexing circuitry for time sharing a common conductor. 4,010,385, Cl. 307-243.000.
Kroon, Pieter J.: *See—*
Bonanno, Frank Joseph; Kaiser, Richard B.; and Kroon, Pieter J., 4,009,657.
Kubinski, Donald C.; and Riggs, Robert S., to Goodyear Tire & Rubber Company, The. Tire building drum. 4,010,058, Cl. 156-415.000.
Kubota, Hironobu: *See—*
Miura, Takashi; Terada, Hideto; Inoue, Takao; and Kubota, Hironobu, 4,009,747.
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Kubota, Yuichi; Umeki, Shinji; and Tokuoka, Yasumichi, to TDK Electronics Company, Limited. Magnetic powder. 4,010,310, Cl. 427-403.000.
Kudlich, Hans, to Schablonen Technik Kufstein Ges.m.b.H. Drum recording means with dual scanning heads. 4,010,320, Cl. 358-289.000.
Kugimoto, Junichi: *See—*
Mikami, Ichiro; Danno, Sadao; Uchida, Izuhiko; Tasaki, Yasutaka; Kugimoto, Junichi; and Fujitsu, Satoru, 4,010,206.
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Kulhanek, James A.: *See—*
Leskovec, Edward V.; and Kulhanek, James A., 4,009,765.
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Kume, Yoshiharu: *See—*
Yamamoto, Hisao; Inaba, Shigeho; Hirohashi, Toshiyuki; Yamamoto, Michihiro; Ishizumi, Kikuo; Akatsu, Mitsuhiro; Maruyama, Isamu; Mori, Kazuo; Kume, Yoshiharu; and Izumi, Takahiro, 4,010,154.

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Kurahashi, Yoshio: *See—*
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Kurita, Takaji; and Fujiwara, Takao, to Minolta Camera Kabushiki Kaisha. Belt support structure in copying machine. 4,009,958, Cl. 355-16.000.

Kuzma, Edward J., to Celanese Corporation. Aqueous emulsion copolymers of vinyl alkanoates, alkyl, acrylates, and acrylic modified alkyds. 4,010,126, Cl. 260-22.0CB.

Kyle, Joseph H.: *See—*
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La Telemecanique Electrique: *See—*
Lascarrou, Alain, 4,009,507.

Labrecque, Roger. Method of making a composite urethane foam and concrete construction panel. 4,010,232, Cl. 264-46.400.

Lace, Melvin Arthur, to Motorola, Inc. Planetary potentiometer assembly. 4,010,439, Cl. 338-125.000.

Lach, Ronald Louis, to Elec-Tro-Tec, Inc. Traffic error correcting circuit for traffic dispatching system. 4,010,404, Cl. 361-179.000.

Lacorre, Jean-Baptiste, to Societe d'Etudes, Recherches et Constructions Electroniques Sercel. Velocity pickups of the horizontal seismometer type. 4,010,443, Cl. 340-17.00R.

Ladd, Charles Ray, to Coats & Clark, Inc. Method of stacking rolls. 4,009,674, Cl. 112-265.000.

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White, James, 4,010,027.

Lammersen, William B., to Patterns to Play By, Inc. Recreational device. 4,009,880, Cl. 273-1.00R.

Lamy, Jacques Edouard, to C. G. Doris. Method of and a device for forming a fluidtight duct transition through a wall. 4,009,584, Cl. 61-107.000.

Lanam, Richard D.: *See—*
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Landert, Erik: *See—*
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Langbein, Adolf; Merz, Herbert; Walther, Gerhard; and Stockhaus, Klaus, to Boehringer Ingelheim GmbH. N-(furyl-methyl)-2-hydroxy-5,9,9-trimethyl-benzomorphans and salts thereof. 4,010,164, Cl. 260-293.540.

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Brugger, Robert; Kohl, Martin; and Krause, Horst, 4,010,084.

Lange, Fritz-Walter; Haffner, Gert; and Muller, Jens, to Meditest Institut fur Medizinisch Pharmazeutische Untersuchungen GmbH. Process for the manufacture of 1,3-bis-(β-ethylhexyl)-5-amino-5-methyl-hexahydropyrimidine. 4,010,160, Cl. 260-256.40H.

Langrehr, Larry L.: *See—*
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Lankford, Floyd L.: *See—*
Marshall, Paul W.; Singleton, Harold C.; Copp, Clyde L.; Lankford, Floyd L.; and George, Patsy L., 4,009,817.

Larin, Marxen Petrovich. Method of producing vacuum in recipient and vacuum pump for effecting same. 4,009,585, Cl. 62-55.500.

Larkin, John M. Sample enlarging material display device. 4,009,533, Cl. 40-28.00B.

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Nielsen, Robert P.; and La Rochelle, John H., 4,010,115.

Larock, Richard Craig, to Iowa State University Research Foundation, Inc. Butenolide synthesis via carbonylation of vinylmercurials. 4,010,170, Cl. 260-343.600.

LaSalle Machine Tool, Inc.: *See—*
Vandenkieboom, John, 4,009,968.

Lascarrou, Alain, to La Telemecanique Electrique. Door pivoting device. 4,009,507, Cl. 16-171.000.

Lascelles, Daniel J.; and French, Dexter Spear, Jr., to Dunkley Company. Fruit pitting machine. 4,009,650, Cl. 99-490.000.

Latassa, Frank M.: *See—*
Bessone, Carlo S.; and Latassa, Frank M., 4,010,399.

Latterman, Robert C.; and Mirell, Stuart G. Light deflection apparatus. 4,010,361, Cl. 240-10.00R.

Laubie, Michel: *See—*
Regnier, Gilbert; Canevari, Roger; Laubie, Michel; and Poignant, Jean-Claude, 4,010,267.

Lauer, James L.; and Peterkin, Melvin E., to Sun Oil Company of Pennsylvania. Emission spectroscopic system having compensation for background radiation. 4,009,962, Cl. 356-82.000.

Lawrence, George J.: *See—*
Klein, Keith W.; Palmieri, Joseph M.; and Lawrence, George J., 4,010,432.

Lawrence Peska Associates, Inc.: *See—*
Bjerkgard, Bjorn, 4,009,762.

Layton, Claude D., to Layton Manufacturing Co., Inc. Road roller vehicle with water applicator. 4,009,967, Cl. 404-129.000.

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Leach, Bruce E.; and Rose, Leroy, to Continental Oil Company. Settlers for copper liquid extraction systems. 4,010,099, Cl. 210-21.000.

Learncom, Inc.: *See—*
Agnew, Paul G.; and Becker, Stephen P., 4,009,781.

Leary, Bruce: *See—*
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LeCorgne, William R., to Interpile USA, Inc. Method for forming deep cast-in-place caseless concrete piles. 4,009,582, Cl. 61-53.640.

Lednicer, Daniel, to Upjohn Company, The. Organic compounds. 4,010,201, Cl. 260-570.5CA.

Lee, Martin, to American Tack & Hardware Co., Inc. Wall plate for electrical switches, electrical outlets and the like. 4,009,797, Cl. 220-242.000.

Lee, Robert E., to Lincoln Manufacturing Company, Inc. Proofing cabinet. 4,010,349, Cl. 219-401.000.

Lees, John N., Jr.: *See—*
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Lehmann, Gunter: *See—*
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LeMay, Christopher Archibald Gordon, to EMI Limited. Computerized tomography apparatus with means to periodically displace radiation source. 4,010,370, Cl. 250-366.000.

LeMay, Christopher Archibald Gordon, to EMI Limited. Method and apparatus for scanning in computerized tomography. 4,010,371, Cl. 250-366.000.

Lenz, Hans; Muschelknautz, Edgar; Herold, Heiko; Bernklau, Kurt; and Georgias, Lutz, to Bayer Aktiengesellschaft. Apparatus for false-twisting synthetic filament yarns. 4,009,563, Cl. 57-77.300.

Leroy, Jean Marie Louis: *See—*
Brouard, Claude Marie Henri Emile; Leroy, Jean Marie Louis; and Stiot, Jean-Pierre Henry, 4,010,151.

Leskovec, Edward V.; and Kulhanek, James A., to Towmotor Corporation. Adjustable lift chain anchor for fork lift mast units. 4,009,765, Cl. 187-9.00E.

Leslie, Thomas Foster: *See—*
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Levine, Gerald: *See—*
Saggese, Michael Frank; Levine, Gerald; and Beckman, William E., 4,010,128.

Levine, Peter Alan, to RCA Corporation. Smear reduction in CCD imagers. 4,010,319, Cl. 358-213.000.

Levy, Albert: *See—*
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Lewis, Charles W.; and Parker, Earl E., to PPG Industries, Inc. Impact-resistant glass-polyesterurethane laminates. 4,010,311, Cl. 428-424.000.

Lewis, John C., Jr., to Tucel Industries, Inc. Tuft forming device. 4,009,910, Cl. 300-21.000.

Lewis, Scott Clarence, to International Business Machines Corporation. Stored charge differential sense amplifier. 4,010,453, Cl. 340-173.00R.

Licentia Patent-Verwaltungs-G.m.b.H.: *See—*
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Lightfoot, Edwin N.: *See—*
Hirschfelder, Joseph O.; Lightfoot, Edwin N.; and Howard, David W., 4,010,095.

Lile, William H. Single shovel holder. 4,009,853, Cl. 248-201.000.

Lin, Kuo-Chuan: *See—*
Tsay, Yaw Jenn; and Lin, Kuo-Chuan, 4,010,080.

Lincoln Brass Works, Inc.: *See—*
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Lincoln Manufacturing Company, Inc.: *See—*
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Lind, Kurt Bertil Reinhold, to Telefonaktiebolaget L M Ericsson. Synchronization method for the recovery of binary signals. 4,010,421, Cl. 325-38.00A.

Lindblad, Oskar Lennart. Deflection device for safety belts. 4,009,510, Cl. 24-196.000.

Linden-Alimak AB: *See—*
Stadigh, Hans-Goran, 4,009,767.

Lindros, Charles Jerome: *See—*
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Lingnau, Horst, to Woma-Apparatebau Wolfgang Maasberg & Co. GmbH. Shutoff valve for high-pressure spray guns. 4,009,860, Cl. 251-44.000.

Link, William Trevor; Rugge, Henry Ferdinand; and Jansen, William David, to American Optical Corporation. Apparatus and process for determining systolic pressure. 4,009,709, Cl. 128-2.05A.

Linquist, Wayne A., to Greenlee Brothers and Co. Tube bending tool with angle sighting means. 4,009,602, Cl. 72-459.000.

Lippincott, George W.: *See—*
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Litt, Terry D.; Shelton, Richard C.; and Colwell, Earl J., to ESB Incorporated. Scrap battery plate reclaiming process. 4,009,833, Cl. 241-14.000.

Littlewood, Kenneth Joseph. Method of and apparatus for handling fabric workpieces. 4,009,786, Cl. 214-8.50C.

Litton Systems, Inc.: *See—*
Knowles, Robert Gordon, 4,009,927.

Liu, Yet-Zen, to International Telephone and Telegraph Corporation. Current confining light emitting diode. 4,010,483, Cl. 357-17.000.

Locatelli, Jean-Louis: *See—*
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Locke, David R.; and Szymansky, Edward, to Sperry Rand Corporation. Electric dry shaver having flexible foil type outer cutter. 4,009,518, Cl. 30-43.920.

Loctite Corporation: *See—*
Costa, Charles R.; and Smigel, Robert L., 4,009,804.

Loesche Hartzerkleinerungs -und Zementmachinen KG: *See—*
Eicke, Gerd, 4,009,992.

Loewe, Heinz; Urbanietz, Josef; Duwel, Dieter; and Kirsch, Reinhard, to Hoechst Aktiengesellschaft. Anthelmintically active basically substituted 2-carbalkoxy-amino-benzimidazolyl-5(6)-phenyl ethers and -ketones. 4,010,272, Cl. 424-273.000.

Lohnert, Gunter; and Muller-Frank, Ulrich, to Interatom, Internationale Atomreaktorbau GmbH. Absorber element for pebble-bed reactors. 4,010,070, Cl. 176-86.00R.

Lombard, Claude, to Regie Nationale des Usines Renault. Energy exchanger for an electrical vehicle. 4,010,407, Cl. 318-63.000.

Lorch, Hugh Olaf; and Reece, Albert Benjamin John, to English Electric Company, Limited, The. Dynamo-electric machines. 4,010,393, Cl. 310-194.000.

Lorch, Hugh Olaf; and Reece, Albert Benjamin John, to English Electric Company Limited, The. Support for an end winding of a rotor of a dynamo-electric machine. 4,010,394, Cl. 310-194.000.

Lorenz, Gunter: *See—*
Radlmann, Eduard; Schaffner, Heinz; Lorenz, Gunter; and Nischk, Gunther, 4,010,104.

Loy, John S.; Hankel, Melvin C.; and Robbins, Elmer A., to Tokheim Corporation. Fluid dispenser. 4,009,800, Cl. 222-28.000.

Loyless, James E., to Vulcan Materials Company. Recovery of hydrogen chloride from chlorinated hydrocarbons such as chloromethanes. 4,010,017, Cl. 62-28.000.

Lucifer S.A.: *See—*
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Ludszeweit, Dieter: *See—*
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Lugosi, Robert: *See—*
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Lutz, David E. Conveyor. 4,009,774, Cl. 198-773.000.

Lynch, Thomas M.: *See—*
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Lynch, William M.: *See—*
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M & T Chemicals Inc.: *See—*
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MacDonald, Edward J.: *See—*
MacDonald, Kenneth A.; and MacDonald, Edward J., 4,009,918.

MacDonald, Kenneth A.; and MacDonald, Edward J. Height adjustable cabinet. 4,009,918, Cl. 312-255.000.

Macemon, Herbert J.; Martin, Vance; and Fisher, John L., to Kuhlman Corporation. Fuse holders for transformers. 4,010,437, Cl. 337-204.000.

Machleder, Warren H.: *See—*
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MacLeay, Ronald Edward; and Sheppard, Chester Stephen, to Pennwalt Corporation. Aliphatic alpha-(hydroperoxy) azo compounds and salts thereof. 4,010,152, Cl. 260-192.000.

Madge, Gordon H.: *See—*
Irwin, Donald A., Sr.; Madge, Gordon H.; Kloss, Charles F.; and Stone, Allen L., 4,010,028.

Maekawa, Yuji: *See—*
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Abe, Kuniomi; and Maekawa, Yuji, 4,009,929.
Abe, Kuniomi; and Maekawa, Yuji, 4,009,930.

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Mahn, Frederick R.: *See—*
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Maier, Johann H., to Universal Plastic Pipe Bending Corporation. Mechanism for forming an enlarged coupling on the ends of plastic pipe. 4,009,982, Cl. 425-389.000.

Makdad, Albert G.: *See—*
Bailer, Edmund F.; and Makdad, Albert G., 4,010,380.

Male, Alan T.: *See—*
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Malsby, Marc W.; and Clark, Kenneth M., to Deutsch Company Electronic Components Division, The. Optical waveguide connector. 4,009,931, Cl. 350-96.00C.

Man-Gill Chemical Company: *See—*
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Mannesmann Aktiengesellschaft: *See—*
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Keddeinis, Heinrich; and Wunnenberg, Klaus, 4,009,748.

Mannesmannrohren-Werke AG: *See—*
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Manoury, Philippe Michel Jacques: *See—*
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Manz, Herbert: *See—*
Forberg, Hans-Jurgen; Haese, Hans-Joachim; and Manz, Herbert, 4,009,715.

Marazzi, Pietro. Automatic plant for the drying and fast single-phase firing of ceramic tiles. 4,009,993, Cl. 432-122.000.

Marchhart, Helmut, to Donau Chemie Aktiengesellschaft. Device for effecting a gastight closure. 4,010,313, Cl. 13-33.000.

Marcum, Jess I., to Rand Corporation, The. Interference suppression. 4,010,469, Cl. 343-18.00E.

Marechal, Michel: *See—*
Pleska, Jean-Pierre; and Marechal, Michel, 4,010,229.

Marquette, Ralph L.; and Jones, James E., to Mutz Corporation. Fitting for insulated duct. 4,009,894, Cl. 285-183.000.

Marshall, Paul W.; Singleton, Harold C.; Copp, Clyde L.; Lankford, Floyd L.; and George, Patsy L., to Bama Pie, Inc. Tray for shipment of frozen items. 4,009,817, Cl. 229-2.50R.

Martin, Adolf: *See—*
Wittler, Hilmar; and Martin, Adolf, 4,009,671.

Martin, Luther W.; and Smith, Richard L. Methods of sealing annular space between inner and outer gas mains for tie-overs. 4,009,732, Cl. 138-97.000.

Martin, Roger G., to Master Unit Die Products, Inc. Molding die apparatus. 4,009,979, Cl. 425-107.000.

Martin, Vance: *See—*
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Martt, Judson W., to National Steel Corporation. Apparatus for quenching and cooling coke. 4,010,081, Cl. 202-228.000.

Maruhashi, Motokazu; Tsutsumi, Shuji; and Komazawa, Shinichi, to Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha. Electroconductive material. 4,010,117, Cl. 252-500.000.

Maruyama, Isamu; Nakao, Masaru; Sasajima, Kikuo; Inaba, Shigeho; and Yamamoto, Hisao, to Sumitomo Chemical Company, Limited. Phenoxyalkylamine derivatives and preparation thereof. 4,010,280, Cl. 424-316.000.

Maruyama, Isamu: *See—*
Yamamoto, Hisao; Inaba, Shigeho; Hirohashi, Toshiyuki; Yamamoto, Michihiro; Ishizumi, Kikuo; Akatsu, Mitsuhiro; Maruyama, Isamu; Mori, Kazuo; Kume, Yoshiharu; and Izumi, Takahiro, 4,010,154.

Maruyama, Takashi, to Nippon Kogaku K.K. Contour line plotting devices. 4,009,961, Cl. 356-2.000.

Marzetta, Louis A., to United States of America, Commerce. Cool-touch cooking surfaces. 4,009,704, Cl. 126-221.000.

Maschinenfabrik Augsburg-Nurnberg AG: *See—*
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Mason, Ronald F.: *See—*
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Wood, Derek A.; and Mason, Ronald F., 4,010,087.

Mason, William B., to TECCOR Electronics, Inc. Solid state time delay and holding circuit. 4,010,389, Cl. 307-293.000.

Massachusetts Institute of Technology: *See—*
Jolly, David C.; and King, Daniel J., 4,010,316.

Massey-Ferguson Inc.: *See—*
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Mast, Aquila D., to Sperry Rand Corporation. Synchronizing roll forming and wrapping operations in a crop material roll forming machine. 4,009,559, Cl. 56-343.000.

Master Unit Die Products, Inc.: *See—*
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Matalia, Harshad D., to American Newspaper Publishers Association, Inc. Manual flying paster. 4,009,841, Cl. 242-58.300.

Matharu, Saroop Singh; Rowlands, David Alun; Westwood, Robert; and Taylor, John Bodenham, to Roussel-UCLAF. Derivatives of hexahydrodibenzofuran-3-one, their preparation and use in pharmaceutical compositions. 4,010,268, Cl. 424-250.000.

Matheny, Coy Edwin, to International Telephone and Telegraph Corporation. Link circuit for intercom unit. 4,010,332, Cl. 179-99.000.

Mathieu, Hansjorg: *See—*
Steinrotter, Heinz; Walderbach, Karl; and Mathieu, Hansjorg, 4,010,246.

Matsubara, Toru; Nakano, Toshikazu; and Nomura, Kazuo, to Tokyo Juki Kogyo Kabushiki Kaisha. Print hammer actuation device. 4,009,655, Cl. 101-93.310.

Matsui, Kazuo; Shigematsu, Taichiro; Shibahara, Tetsuya; and Nakazawa, Makoto, to Mitsubishi Chemical Industries Ltd. Method for producing N-(4-fluorophenyl)-2,3,-dichloromaleimide. 4,010,182, Cl. 260-326.5FM.

Matsumura, Yasuo; Kishimoto, Soichiro; and Ozaki, Masahiko, to Japan Exlan Company Limited. Process for producing carbon fibers. 4,009,991, Cl. 432-23.000.

Matsuo, Kotaro; Shimizu, Katsuhisa; Hoshiba, Michimasa; and Chihara, Machio, to Arakawa Rinsan Kagaku Kogyo Kabushiki Kaisha. Hydrogenated resin and compositions containing the same. 4,010,130, Cl. 260-28.5AV.

Matsushita Electric Industrial Co., Ltd.: *See—*
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Nishioka, Matsuo; and Oka, Shunzo, 4,010,382.
Tanaka, Junzo; Takami, Tsuyoshi; and Kai, Toshio, 4,010,343.
Yasumatsuya, Noboru; and Isobe, Mitsuo, 4,010,401.

Matsushita Electric Works, Ltd.: *See—*
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Matthias, Guenther: *See—*
Aicher, Albrecht; Haas, Hans; Sperber, Heinrich; Diem, Hans; Matthias, Guenther; and Lehmann, Gunter, 4,010,208.

Maurer, Fritz: *See—*
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Mayer, Edward A., to Texaco Inc. Piston with turbulence inducing face configuration. 4,009,702, Cl. 123-193.00P.

Maziuk, John, to Mobil Oil Corporation. Method of operating a platinum reformer comprising a selective zeolite catalyst in third reactor. 4,010,093, Cl. 208-65.000.

Mazor, Stanley: *See—*
Faggin, Federico; Shima, Masatoshi; and Mazor, Stanley, 4,010,449.

McBride, David L., to Energy and Materials Conservation Corporation. Method for increasing the use of scrap and iron oxides by basic oxygen furnace. 4,010,029, Cl. 75-60.000.

McCaffrey-Ruddock Tagline Corporation: *See—*
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McCaully, Ronald J.: *See—*
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McClure Furniture Industries, Inc.: *See—*
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McCormick, Mathew, to Bowthorp Hellerman Limited. Cable ties. 4,009,509, Cl. 24-16.0PB.

McCoy, John F., to Alco Standard Corporation. Energy-conserving, fast-cooling heat treating furnace. 4,009,872, Cl. 266-250.000.

McDonough Manufacturing Company: *See—*
Detjen, Robert K., 4,009,632.

McGill, Howard L.; Randermann, Ervin, Jr.; and Musik, Olgierd J., to Schlumberger Technology Corporation. Subsea master valve apparatus. 4,009,753, Cl. 166-55.100.

McGuire, Ronald F., to Anaconda Company, The. Out-of-band signaling method and apparatus to adapt payphones to telephone systems. 4,010,328, Cl. 179-81.00R.

McKenzie, James W. Combined generator and boat propulsion system. 4,010,377, Cl. 290-1.00R.

McKinney, Claude O., to Standard Oil Company. Combusting flue gas in a cracking catalyst regeneration process. 4,010,094, Cl. 208-164.000.

McLoughlin, Bernard Joseph; and Guildford, Allen John, to Imperial Chemical Industries Limited. Phenylvinyl morpholine compounds. 4,010,266, Cl. 424-248.400.

McQueston, Herbert J.: *See—*
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Mead Corporation, The: *See—*
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Meditest Institut fur Medizinisch Pharmazeutische Untersuchungen GmbH: *See—*
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Meiji Seika Kaisha, Ltd.: *See—*
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Melchior, Jean F., to French State, The. Compression-ignition internal combustion engines. 4,009,574, Cl. 60-606.000.

Menges, John R.: *See—*
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Merchants National Bank of Manchester: *See—*
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Merck & Co., Inc.: *See—*
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Merker, Steven L.: *See—*
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Merz, Herbert: *See—*
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Metrier, Michel, to Koch Transporttechnik GmbH. Reversible direction bucket wheels. 4,009,531, Cl. 37-189.000.

Metzeler Kautschuk AG: *See—*
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Metzger, Jacques V., to Agence Nationale de Valorisation de la Recherche (ANVAR). Photosensitive layer and method of forming a photographic image therefrom. 4,010,033, Cl. 96-48.00R.

Meuwes, Willy Frans Lucia, to U.S. Philips Corporation. Electric device provided with a gas and/or vapor discharge lamp. 4,010,398, Cl. 315-101.000.

Meyer, Arnold Wilhelm: *See—*
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Meyer, Gustave, to Stumpf, Irvin L., a part interest. Skid steer vehicle. 4,009,761, Cl. 180-6.200.

Meyers, Franklin J.; and Sturiale, Gino R., to Hughes Aircraft Company. Self-stabilizing image scanner. 4,010,365, Cl. 250-236.000.

Michielli, Joseph Frank. Ice cream dispensing machine. 4,009,740, Cl. 141-172.000.

Midway Fishing Tool Co.: *See—*
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Mikami, Ichiro; Danno, Sadao; Uchida, Izuhiko; Tasaki, Yasutaka; Kugimoto, Junichi; and Fujitsu, Satoru, to UBE Industries, Ltd. Method for producing cyclohexanone and alkyl-substituted or unsubstituted phenol. 4,010,206, Cl. 260-586.00P.

Mildner, Raymond C., to Dow Chemical Company, The. Shielding tape for cables. 4,010,315, Cl. 174-107.000.

Miles, Clifford Granville: *See—*
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Miller, Hallie E.; and Kittrell, Nancy W., to Raymond Lee Organization, Inc., The, a part interest. Disposable table paper basket. 4,009,819, Cl. 229-32.000.

Miller, Robert A.: *See—*
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Miller, Robert C.: *See—*
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Minesinger, David Ellsworth; and Leslie, Thomas Foster, to Procter & Gamble Company, The. Tamper-proof closure seal. 4,009,793, Cl. 215-246.000.

Minnesota Mining and Manufacturing Company: *See—*
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Mitchell, Beatty Thomas. Rotary hook sewing machine. 4,009,670, Cl. 112-231.000.

Mitsubishi Chemical Industries Ltd.: *See—*
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Mitsubishi Rayon Co., Ltd.: *See—*
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Mitsui-Anaconda Electro Copper Sheet Co., Ltd.: *See—*
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Miura, Takashi; Terada, Hideto; Inoue, Takao; and Kubota, Hironobu, to Sintokogio, Ltd. Method of and device for forming vacuum sealed molds. 4,009,747, Cl. 164-7.000.

Miura, Yuichi; Yutani, Kiyohiko; and Izumi, Yusuke, to Tokuyama Soda Kabushiki Kaisha. Process for preparing L-tartaric acid. 4,010,072, Cl. 195-30.000.

Miyamoto, Koichi: *See—*
Komori, Shigehiro; Sakamaki, Hisashi; Hattori, Hiroyuki; Iida, Toshihide; Miyamoto, Koichi; and Umezawa, Kazumi, 4,009,955.

Miyata, Toshihiko, to Sony Corporation. Load protective circuit. 4,010,402, Cl. 361-56.000.

Mo och Domsjo: *See*—
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Mobil Oil Corporation: *See*—
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Mohsen, Amr Mohamed, to Bell Telephone Laboratories, Incorporated. Charge injection input network for semiconductor charge transfer device. 4,010,484, Cl. 357-24.000.
Moldovan, Michael Terrance, Jr.; Lindros, Charles Jerome; Wescott, Robert Dean; Snyder, Benedict Stewart, II; Cusimano, Richard John; and Kristan, Michael, to AVM Corporation. Electronic voting machine with cathode ray tube display. 4,010,353, Cl. 235-54.00F.
Molny, Marvin J., to Sperry Rand Corporation. Zero speed calibration method and apparatus for use with an electro-magnetic underwater log for marine vessels. 4,009,603, Cl. 73-3.000.
Molzahn, Herbert W., to International Harvester Company. Crop harvester drive and control system. 4,009,556, Cl. 56-10.700.
Monjo, Jacques Yves. Machine for filling pockets. 4,009,553, Cl. 53-160.000.
Monroe, Carl M.: *See*—
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Moran, George W. Rotary internal combustion engine. 4,009,690, Cl. 123-8.450.
Morean, James Elroy: *See*—
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Morgan, Jerry E.; Lynch, William M.; and Pelton, Paul M. Automatic oil-water separating device. 4,010,103, Cl. 210-242.00R.
Mori, Kazuo: *See*—
Yamamoto, Hisao; Inaba, Shigeho; Hirohashi, Toshiyuki; Yamamoto, Michihiro; Ishizumi, Kikuo; Akatsu, Mitsuhiro; Maruyama, Isamu; Mori, Kazuo; Kume, Yoshiharu; and Izumi, Takahiro, 4,010,154.
Morisaki, Shigeyoshi; and Mase, Kazuo, to Mitsui-Anaconda Electro Copper Sheet Co., Ltd. Copper foil having bond strength. 4,010,005, Cl. 29-195.000.
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Morozowich, Walter, to Upjohn Company, The. Substituted keto and alkoxy 16-phenoxy and 17-phenyl PGE_2-type compounds. 4,010,172, Cl. 260-390.000.
Morris, Lance: *See*—
Casler, William H.; and Morris, Lance, 4,009,499.
Morris, Lowell H., to Morris Manufacturing Company. Back-pack frame. 4,009,809, Cl. 224-25.00A.
Morris Manufacturing Company: *See*—
Morris, Lowell H., 4,009,809.
Morris, William Emery, to Du Pont de Nemours, E. I., and Company. Apparatus and process for measuring fuel octane numbers. 4,010,358, Cl. 235-151.350.
Morrison, Charles F. Vapor injection system for fuel combustion. 4,009,984, Cl. 431-4.000.
Morrison-Knudsen Company, Inc.: *See*—
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Morse, Robert L., to Tecumseh Products Company; and Sharon Manufacturing Company. Suction accumulator. 4,009,596, Cl. 62-503.000.
Mosse, Alfred Lvovich; Pechkovsky, Vladimir Vasilievich; Teterevkov, Anatoly Ivanovich; Burov, Igor Sergeevich; Vilk, Jury Nikolaevich; Ershov, Vadim Andreevich; Chelnokov, Alexandr Antonovich; Yasko, Oleg Iosifovich; Bysjuk, Vladimir Vladimirovich; and Dzjuba, Elena Dmitrievna. Process for the production of hydrogen fluoride, phosphoric anhydride, calcium polyphosphates and nitric acid. 4,010,241, Cl. 423-304.000.
Motohashi, Michio: *See*—
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Mott, William E. Method of and apparatus for rapidly lining containers. 4,009,646, Cl. 93-36.010.
Mountcastle, Paul H.; and O'Berry, William A., to Westinghouse Electric Corporation. Antenna scanning apparatus. 4,010,472, Cl. 343-761.000.
Moyer, Charles G. Police officer's club holder for vehicle door. 4,009,854, Cl. 248-300.000.
Moyer, G. A., to Phillips Petroleum Company. Glycol regeneration. 4,010,009, Cl. 55-32.000.
Mraz, Joseph. Pneumatic conveying apparatus and method. 4,009,912, Cl. 302-25.000.
Mulder, Rudolf; and Wellinga, Kobus, to U.S. Philips Corporation. Novel pyrazoline compounds having insecticidal activity. 4,010,271, Cl. 424-273.000.
Muller-Frank, Ulrich: *See*—
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Muller, Herbert, to W. Schlafhorst & Co. Blast nozzle for rotating textile coils. 4,009,840, Cl. 242-35.60E.
Muller, Hermann; Sandl, Dieter; Sylla, Jurgen; and Schroder, Rolf, to AGFA-Gevaert, A.G. Method of and apparatus for splicing the ends of film strips. 4,010,062, Cl. 156-506.000.
Muller, Jens: *See*—
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Multiplex Communications, Inc.: *See*—
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Munro, James M.; Ramstad, David L.; and Getty, Paul M., to United States of America, Navy. Helicopter launch and recovery device for horizontal floating ASW mobile targets. 4,009,635, Cl. 89-1.50G.
Murao, Sawao, to Ajinomoto Co., Inc.; and Eisai Co., Ltd. Microbial amylase inhibitor and preparation thereof with the use of streptomyces diasticus var. amylostaticus. 4,010,258, Cl. 424-115.000.
Muraoka, Teruo; Nisikawa, Kazunori; and Seki, Kohji, to Victor Company of Japan, Limited. Record disc recording system with a distortion signal. 4,010,333, Cl. 179-100.40C.
Murayama, Takao, to Taisei Kensetsu Kabushiki Kaisha; and Tokyo Gas Company Limited. Equipment for treating waste gas containing tar mist. 4,010,013, Cl. 55-286.000.
Murley, Ellsworth M., Jr.; and Davis, Allen, to Owens-Illinois, Inc. Multiplex addressing of colloidal light valves. 4,009,937, Cl. 350-160.00R.
Murray, Donald L.; Lees, John N., Jr.; and Toman, Frank W., Jr., to Allis-Chalmers Corporation. Pneumatic classifier for refuse material with adjustable air intake. 4,010,096, Cl. 209-139.00R.
Murray, Donald L.; Lees, John N., Jr.; and Toman, Frank W., Jr., to Allis-Chalmers Corporation. Pneumatic classifier for refuse material with double vortex airflow. 4,010,097, Cl. 209-139.00R.
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Naegeli, Peter, to Givaudan Corporation. Novel odorants. 4,010,213, Cl. 260-617.00R.
Naegeli, Werner, to Pavena AG. Process for continuously bonding staple fibers into an essentially non-twisted yarn. 4,010,056, Cl. 156-296.000.
Naegeli, Werner, to Pavena AG. Process for continuously bonding staple fibers into a stable band and stable band produced according to the aforesaid process. 4,010,295, Cl. 428-361.000.
Nagatomo, Masatugu, to Kabushiki Kaisha Komatsu Seisakusho. Automatically adjusting braking device. 4,009,769, Cl. 188-77.00R.
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Nakanishi, Michio; Araki, Kazuhiko; Tahara, Tetsuya; and Shiroki, Masami, to Yoshitomi Pharmaceutical Industries, Ltd. Thienodiazepines. 4,010,184, Cl. 260-332.20R.
Nakanishi, Motoyasu, to Kabushiki Kaisha Kobayashi. Printing apparatus. 4,010,057, Cl. 156-384.000.
Nakano, Toshikazu: *See*—
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Nakayama, Takashi, to Du Pont de Nemours, E. I., and Company. Low-fire green ceramic articles and slip compositions for producing same. 4,010,133, Cl. 260-29.6TA.
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Nathanson, Harvey C., to Westinghouse Electric Corporation. High resolution low bandwidth portable telecommunication system. 4,010,322, Cl. 358-233.000.
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National Patent Development Corporation: *See—*
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Nelson, Gunner E., to Ethyl Corporation. Chemical process. 4,010,187, Cl. 260-448.00A.
Nelson, Gunner E., to Ethyl Corporation. Process for producing trialkali metal aluminum hexahydride. 4,010,248, Cl. 423-644.000.
Nelson, Norman A., to Upjohn Company, The. 5-Oxa phenyl- and phenoxy-substituted prostaglandin E_1 analogs. 4,010,192, Cl. 260-473.00G.
Nelson, Norman A., to Upjohn Company, The. 5-Oxa phenyl- and phenoxy-substituted prostaglandin A_1 analogs. 4,010,194, Cl. 260-473.00G.
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Nemec, Joseph W.; and Stewart, Thomas, to Rohm and Haas Company. Divinylacetylenes as polymerization inhibitors for acrylic and methacrylic acid. 4,010,082, Cl. 203-8.000.
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Nishino, Tatuji. Apparatus for mending a puncture in a tubeless tire. 4,009,624, Cl. 81-15.700.
Nishioka, Matsuo; and Oka, Shunzo, to Matsushita Electric Industrial Co., Ltd. Push-button type pulse generating switch. 4,010,382, Cl. 307-106.000.
Nisikawa, Kazunori: *See—*
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Nobusawa, Tsukumo, to Asahi Kogaku Kogyo Kabushiki Kaisha. Focusing apparatus for optical systems. 4,010,479, Cl. 354-25.000.
Noetzel, Siegfried; Jastrow, Horst; and Fischer, Edgar, to Hoechst Aktiengesellschaft. Bromine containing telomeric phosphonic acid esters as flame retardant agents. 4,010,225, Cl. 260-880.00R.
Noguchi, Koichi: *See—*
Suzuki, Shigeru; Iwamoto, Minoru; Noguchi, Koichi; Omi, Kyoji; and Nishikawa, Tatsuo, 4,009,957.
Nolde, George V.: *See—*
Ress, Thomas I.; and Nolde, George V., 4,010,396.
Nomura, Kazuo: *See—*
Matsubara, Toru; Nakano, Toshikazu; and Nomura, Kazuo, 4,009,655.
Nordquist, Karen A.: *See—*
Phillips, Kenneth G.; Ballweber, Edward G.; Nordquist, Karen A.; and Miller, Robert A., 4,010,131.
Nordson Corporation: *See—*
Scholl, Charles H., 4,009,974.
Norris Industries, Inc.: *See—*
Apczynski, Frederick A., 4,009,911.
North, Irving William, to Brunswick Corporation. Multiple push-pull cable transmission apparatus. 4,009,678, Cl. 115-18.00R.
Nosco, Inc.: *See—*
Hershey, Charles J., Jr.; and Lippincott, George W. (said Lippincott assors. to), 4,010,299.
Novet, Hanspeter: *See—*
Ramseyer, Robert; and Novet, Hanspeter, 4,009,638.
Nozdrovsky, Andrei Stepanovich. Bowl of solids-concentration centrifuge. 4,009,823, Cl. 233-7.000.
Nuclear Engineering Company, Inc.: *See—*
Gablin, Kenneth A.; and Hansen, Larry J., 4,010,108.
Nudelman, Abraham; and McCaully, Ronald J., to American Home Products Corporation. Process for the rearrangement of penicillins to cephalosporins and intermediate compounds thereof. 4,010,156, Cl. 260-243.00C.
Nupnau, Arthur E., to Bell & Howell Company. Threading and synchronization system for sound motion picture projector. 4,009,949, Cl. 352-159.000.
Nusbaum, Max J. Protective covering. 4,009,494, Cl. 2-2.000.
Obenchain, Richard F. Metallurgical shaft furnace. 4,009,870, Cl. 266-192.000.
Obenchain, Richard F. Metallurgical furnace. 4,009,871, Cl. 266-193.000.
Oberley, William J. Compositions for imparting fire retardance to wood. 4,010,296, Cl. 427-393.000.
O'Berry, William A.: *See—*
Mountcastle, Paul H.; and O'Berry, William A., 4,010,472.
Ofstead, Eilert A., to Goodyear Tire & Rubber Company, The. Catalyst for metathesis of cycloolefins. 4,010,113, Cl. 252-429.00B.
Ogawa, Yasuaki: *See—*
Inouye, Shigeharu; Shomura, Takashi; Kojima, Michio; Ogawa, Yasuaki; Watanabe, Hiroshi; Kondo, Yasumitsu; Saito, Kazuo, deceased; Yamada, Yujiro; and Niida, Taro, 4,010,155.
Ohkuoo, Masahiro; and Fukutake, Heiji, to Kabushiki Kaisha Daikin Seisakusho. Torque converter. 4,009,570, Cl. 60-341.000.
Ohloff, Gunther: *See—*
Becker, Joseph J.; Schulte-Elte, Karl-Heinrich; Strickler, Hugo; and Ohloff, Gunther, 4,010,205.
Ohnsorge, Ulrich: *See—*
Koenig, Horst; and Ohnsorge, Ulrich, 4,010,165.
Ohzu, Hitoshi, to Takata Ophthalmic Instruments Co., Ltd. Apparatus for producing optical interference pattern with continuously variable fringe spacing. 4,009,940, Cl. 350-163.000.
Oil States Rubber Company: *See—*
Britton, Frederick G.; and Landers, Don B., 4,009,581.
Oka, Shunzo: *See—*
Nishioka, Matsuo; and Oka, Shunzo, 4,010,382.
Oka, Takashi; Iwasaki, Hiroshi; and Kato, Eiichi, to Nissan Motor Co., Ltd.; Ikeda Bussan Co., Ltd.; and Toray Industries, Inc. Method of producing three-dimensionally shaped inflatable safety bag. 4,010,055, Cl. 156-226.000.
Okada, Yutaka: *See—*
Baba, Yoshihiko; Okada, Yutaka; Horikoshi, Hiroyashi; and Yabe, Yuichiro, 4,010,149.
Okano, Yukio, to Minolta Camera Kabushiki Kaisha. Double layered optical low pass filter permitting improved image resolution. 4,009,939, Cl. 350-162.0SF.
Okasaka, Hotuma: *See—*
Aoyama, Toshikazu; Okasaka, Hotuma; and Kodama, Hiroshi, 4,010,219.
Okawa, Takashi: *See—*
Isogai, Nobuo; Okawa, Takashi; and Takeda, Takako, 4,010,195.

Okubo, Hiroshi; Kato, Masamichi; and Ito, Akihiko, to Japan Atomic Energy Research Institute. Process for preparing highly-cured transparent resin molded products. 4,010,088, Cl. 204-159.240.

Olesch, Reinhard: *See—*
Fishbein, William; Olesch, Reinhard; and Rittenbach, Otto, 4,010,468.

Olin Corporation: *See—*
Preston, Frank J.; and Priga, Peter P., 4,010,211.

Olney, Frederick D., Jr.; and Rich, Dennis E., to Honeywell Information Systems, Inc. Aperture sealing device for film lead fabrication. 4,009,683, Cl. 118-266.000.

Olson, Ulf Torbjorn; and Hagglund, Erik Olof Sture, to Mo och Domsjo. Method for improving heat economy in the batchwise digestion of lignocellulosic material by adjusting the level of free digestion liquor. 4,010,066, Cl. 162-49.000.

Olympia Werke AG: *See—*
Weber, Gerald; and Sorgenfrei, Jurgen, 4,010,359.

Omi, Kyoji: *See—*
Suzuki, Shigeru; Iwamoto, Minoru; Noguchi, Koichi; Omi, Kyoji; and Nishikawa, Tatsuo, 4,009,957.

Onishi, Masaru; and Tomura, Koichi, to Mitsubishi Denki Kabushiki Kaisha. Electrophotographic system. 4,010,031, Cl. 96-1.0TE.

Ono, Kenji: *See—*
Nishimura, Hiromi; Ono, Kenji; Tachibana, Katsumi; and Furukawa, Satoru, 4,010,433.

Ono, Yoshio; and Sakamoto, Takashi. Process for producing color separation record utilizing electroluminescent material. 4,010,032, Cl. 96-31.000.

Onozuka, Mitsuo; Hayashi, Yasuo; and Adachi, Yoshiaki, to Kureha Kagaku Kogyo Kabushiki Kaisha. Anti-fouling composition for use in water comprising a polymer and an organo tin compound. 4,010,141, Cl. 260-45.75K.

Oono, Eishi: *See—*
Kato, Takashi; Oono, Eishi; and Nakamura, Toshihiko, 4,009,698.

Orgill, Rodney H.: *See—*
Bennett, Thomas H.; Carlow, Earl F.; Kouvoussis, Anthony E.; Orgill, Rodney H.; and Wiles, Michael F., 4,010,448.

Ormond, Alfred Newman. Shear measuring flexure isolated load cells. 4,009,608, Cl. 73-141.00A.

Osberghaus, Rainer: *See—*
Reese, Gunter; and Osberghaus, Rainer, 4,010,253.

Osborn, Robert A.: *See—*
Bullard, Herbert L.; and Osborn, Robert A., 4,010,140.

Oscar Mayer & Co. Inc.: *See—*
Borsuk, Alvin; Heydn, Hans H.; and Johnson, Charles H., 4,009,858.

Ota, Yoshihiko, to Victor Company of Japan, Limited. Video recording and reproducing apparatus with crosstalk reduction. 4,010,490, Cl. 358-4.000.

Otterbeck, Finn. Awning system or the like. 4,009,746, Cl. 160-323.00R.

Overhead Door Corporation: *See—*
Bailey, Morris W., 4,010,408.

Overly, John L.: *See—*
Wall, Cothran D.; and Overly, John L., 4,009,597.

Owen, Allan B.; and Lynch, Thomas M., to GTE Sylvania Incorporated. Spring contact switch. 4,010,339, Cl. 200-292.000.

Owens-Corning Fiberglas Corporation: *See—*
Gilbu, Agnar, 4,009,736.
Pinsky, Gordon P., 4,009,735.

Owens-Illinois, Inc.: *See—*
Heckman, Russell William; Nickey, George Allen; and Poole, John Edward, 4,009,681.
Murley, Ellsworth M., Jr.; and Davis, Allen, 4,009,937.
Thomas, Ian M., 4,010,243.

Oxford Laboratories Inc.: *See—*
Koffer, George Warren; and Branham, Doud Roger, 4,009,611.

Ozaki, Masahiko: *See—*
Matsumura, Yasuo; Kishimoto, Soichiro; and Ozaki, Masahiko, 4,009,991.

Pacer S.n.C. of Cerchiai Vanna & C.: *See—*
Alcidi, Mario, 4,009,721.

Package Machinery Company: *See—*
Armour, Donald F.; and Niemi, William B., 4,009,980.

Packaging Corporation of America: *See—*
Fitzgerald, Robert H., 4,009,820.

Pall Corporation: *See—*
Cooper, Roydon B., 4,009,572.

Palmaer, Tore Georg. Switch member for portable, battery-operated apparatus. 4,010,340, Cl. 200-330.000.

Palmieri, Joseph M.: *See—*
Klein, Keith W.; Palmieri, Joseph M.; and Lawrence, George J., 4,010,432.

Pamarco Incorporated: *See—*
Heurich, Charles R., 4,009,658.

Panaview Co.: *See—*
Blind, James P., 4,009,868.

Panduit Corporation: *See—*
Bulanda, John Jean; and Schoenfeld, David Robert, 4,009,852.

Panzone, Gianbattista: *See—*
Tarzia, Giorgio; and Panzone, Gianbattista, 4,010,159.

Papp, Gyula: *See—*
Harsanyi, Kalman; Szekeres, Laszlo; Heja, Gergely; Papp, Gyula; Korbonits, Dezso; and Kiss, Pal, 4,010,193.

Paraschos, Charles: *See—*
Villari, John J., Jr.; and Paraschos, Charles, 4,009,528.

Parasco, Aristotle: *See—*
Banas, Conrad M.; and Parasco, Aristotle, 4,010,345.

Pardos, George. Bacteriological transfer loop. 4,010,077, Cl. 195-127.000.

Parikh, Gokaldas C.; and Ho, Chi Kuan, to United States of America, Navy. Radioactive iodine (125I) labeling of latex particles. 4,010,250, Cl. 424-1.000.

Parise, Carl, to Parise & Sons, Inc. Water valve assembly. 4,009,728, Cl. 137-594.000.

Parise & Sons, Inc.: *See—*
Parise, Carl, 4,009,728.

Park, Joseph K., to United States of America, Agriculture. Friction separator. 4,009,783, Cl. 209-108.000.

Parker Drilling Company, Inc.: *See—*
Houck, Theodore B., 4,009,544.

Parker, Earl E.: *See—*
Lewis, Charles W.; and Parker, Earl E., 4,010,311.

Parker-Hannifin Corporation: *See—*
Sharp, Bernard C., 4,009,503.
Sullivan, Dennis W., 4,009,734.

Parlow, Albert F., to Professional Staff Association of the Los Angeles County Harbor General Hospital. Male contraceptive and method of achieving male contraception. 4,010,256, Cl. 424-88.000.

Patel, Savinay; and Szuhaj, Bernard F., to Central Soya Company, Inc. Web dispenser. 4,009,682, Cl. 118-118.000.

Patrick, William John; Scilla, Salvatore James; and Westdorp, Wolfgang Alfred, to International Business Machines Corporation. Controlling the oxygen content of Czochralski process of silicon crystals by sandblasting silica vessel. 4,010,064, Cl. 156-617.0SP.

Patriquin, George P., to Hudson Lock, Inc. Plunger lock. 4,009,599, Cl. 70-90.000.

Patterns to Play By, Inc.: *See—*
Lammersen, William B., 4,009,880.

Patterson, Daniel W.: *See—*
Insolio, Thomas A.; Fatterson, Daniel W.; and Kozyrski, Vincent T., 4,009,813.

Patterson, Garvin Wesley: *See—*
Porter, Marion G.; Patterson, Garvin Wesley; and Calle, Jaime, 4,010,450.

Patzner, Delbert M. Method for constructing a tunnel or underpass. 4,009,579, Cl. 61-42.000.

Pavena AG: *See—*
Naegeli, Werner, 4,010,056.
Naegeli, Werner, 4,010,295.

Pavlik, Frank J., to Minnesota Mining and Manufacturing Company. Perfluorotertiaryalkyl ethers. 4,010,212, Cl. 260-615.00F.

Pawl, George J.: *See—*
Badalich, Frank C.; and Pawl, George J., 4,009,952.

Pechacek, Raymond E., to Hahn & Clay. Vessel connector. 4,009,798, Cl. 220-325.000.

Pechkovsky, Vladimir Vasilievich: *See—*
Mosse, Alfred Lvovich; Pechkovsky, Vladimir Vasilievich; Teterevkov, Anatoly Ivanovich; Burov, Igor Sergeevich; Vilk, Jury Nikolaevich; Ershov, Vadim Andreevich; Chelnokov, Alexandr Antonovich; Yasko, Oleg Iosifovich; Bysjuk, Vladimir Vladimirovich; and Dzjuba, Elena Dmitrievna, 4,010,241.

Peck, Richard John, to Bell Telephone Laboratories, Incorporated. Digital timing recovery. 4,010,323, Cl. 178-88.000.

Pegg, David R.: *See—*
Secor, Robert B.; Van Nordstrand, Robert A.; and Pegg, David R., 4,010,116.

Pelta, Edmond R., to Autoscan, Inc. Test apparatus. 4,010,368, Cl. 250-343.000.

Pelton, Paul M.: *See—*
Morgan, Jerry E.; Lynch, William M.; and Pelton, Paul M., 4,010,103.

Penkava, Jiri: *See—*
Kadera, Vaclav; Penkava, Jiri; and Vondruska, Miloslav, 4,009,969.

Penn-Dale Knitting Mills, Inc.: *See—*
Faust, Martin H., 4,009,495.

Pennsylvania Crusher Corporation: *See—*
Hahn, William F.; Graf, Carl R.; and Hart, George H., 4,009,834.

Pennwalt Corporation: *See—*
MacLeay, Ronald Edward; and Sheppard, Chester Stephen, 4,010,152.

Perkin-Elmer Corporation, The: *See—*
Boyan, Gerard E.; and Rawlings, John L., 4,009,948.

Persha, Thomas J.; and Jagielski, David, to Bell & Howell Company. Self-adjusting reel. 4,009,842, Cl. 242-71.900.

Peterkin, Melvin E.: *See—*
Lauer, James L.; and Peterkin, Melvin E., 4,009,962.

Peters, Arnold: *See—*
Skrypek, John P.; Peters, Arnold; and Williams, Robert, 4,009,776.

Petersen, Walter Adrian, to International Nickel Company, Inc., The. Welding electrode. 4,010,309, Cl. 428-386.000.

Pfaff, Paul D., to Bernal Incorporated. Self-stripping punch with ears. 4,009,625, Cl. 83-97.000.

Phillips, Bert. ZrO_2-base heating elements. 4,010,352, Cl. 219-553.000.

Phillips, Kenneth G.; Ballweber, Edward G.; Nordquist, Karen A.; and Miller, Robert A., to Nalco Chemical Company. Quaternary modified acrylamide polymers. 4,010,131, Cl. 260-29.4UA.

Phillips, Kenneth G.; and Frisque, Alvin J., to Nalco Chemical Company. Method of sealing leaks in metal oil storage containers. 4,010,231, Cl. 264-35.000.

Phillips, Kenneth G.: *See—*
Hurlock, John R.; and Phillips, Kenneth G., 4,010,142.
Phillips Petroleum Company: *See—*
Alleman, Carl E., 4,010,065.
Benningfield, L. V., Jr., 4,009,998.
Brady, Donnie G., 4,010,137.
Dollinger, Robert E., 4,010,001.
Moyer, G. A., 4,010,009.
Walker, Darrell W.; and Farha, Floyd E., Jr., 4,010,114.
Zuech, Ernest A., 4,010,217.
Pinch, Harry Louis; Abeles, Benjamin; and Gittleman, Jonathan Isaac, to RCA Corporation. High resistance cermet film and method of making the same. 4,010,312, Cl. 428-450.000.
Pinsky, Gordon P., to Owens-Corning Fiberglas Corporation. Thermal insulation. 4,009,735, Cl. 138-147.000.
Pieska, Jean-Pierre; and Marechal, Michel, to Solvay & Cie. Process for the manufacture of short fibrils. 4,010,229, Cl. 264-13.000.
Plessey Company Limited, The: *See—*
James, James Roderick, 4,010,475.
Plessey Handel und Investments A.G.: *See—*
James, James Roderick, 4,010,475.
Plessey Incorporated: *See—*
Fraioli, Anthony V.; and DeRosa, John A., 4,010,025.
PNC Corporation: *See—*
Keuchel, Herbert W.; and Farris, George A., 4,009,812.
Pneumo Corporation: *See—*
Vanderlaan, Robert D., 4,009,642.
Podowski, Robert R., to Zenith Radio Corporation. Signal transmitter using an active thick film substrate. 4,010,447, Cl. 340-167.00R.
Podschus, Ernst, to Bayer Aktiengesellschaft. Production of highly porous active aluminium oxide granulate. 4,010,234, Cl. 264-117.000.
Pohl, Viktor: *See—*
Bochenek, Eduard; Heumann, Heinz; and Pohl, Viktor, 4,010,060.
Poignant, Jean-Claude: *See—*
Regnier, Gilbert; Canevari, Roger; Laubie, Michel; and Poignant, Jean-Claude, 4,010,267.
Polaroid Corporation: *See—*
Greenwald, Richard B., 4,010,168.
Pontoppidan, Jorgen; Sorensen, Erik Tue; and Nielsen, Erik Kjaer, to Schloger, Borge; Tvede-Jensen, Oluf; Landert, Erik; Hansen, Hans Borge; and Wrist, Niels Ove. Systems for the detection of moving objects within a survey area by microwave diffraction. 4,010,459, Cl. 340-258.00A.
Poole, John Edward: *See—*
Heckman, Russell William; Nickey, George Allen; and Poole, John Edward, 4,009,681.
Porter, Marion G.; Patterson, Garvin Wesley; and Calle, Jaime, to Honeywell Information Systems, Inc. Fail soft memory. 4,010,450, Cl. 340-172.500.
Porter, Ronald H.: *See—*
Runyan, Kenneth R.; Honnert, Quentin E.; and Porter, Ronald H., 4,009,789.
Posselt, Klaus: *See—*
Thiele, Kurt; Von Bebenburg, Walter; and Posselt, Klaus, 4,010,191.
Potter, Orville J., III. Game apparatus. 4,009,881, Cl. 273-115.000.
Pourzal, Ali-Akbar: *See—*
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PPG Industries, Inc.: *See—*
Broun, Thorowgood T., Jr., 4,010,186.
Carlin, William W., 4,010,085.
Lewis, Charles W.; and Parker, Earl E., 4,010,311.
Ramler, Warren J., 4,010,374.
Sickles, James E., 4,009,829.
Pragnell, Robert James: *See—*
Blunt, Geoffrey Vincent Dallow; Hodges, Newton John; and Pragnell, Robert James, 4,010,123.
Preston, Frank J.; and Priga, Peter P., to Olin Corporation. Stabilization of polyether polyols. 4,010,211, Cl. 260-611.500.
Price Pfister Brass Mfg. Co.: *See—*
Tolnai, Julius L., 4,009,863.
Price, Roger Charles, to Exxon Research and Engineering Company. Flow improvers. 4,010,006, Cl. 44-62.000.
Priga, Peter P.: *See—*
Preston, Frank J.; and Priga, Peter P., 4,010,211.
Princeton Electronic Products, Inc.: *See—*
Hofstein, Steven R., 4,010,466.
Pritchard, Peter E., to Sonic Research Inc. Stereo phonograph pick-up cartridge. 4,009,885, Cl. 274-37.000.
Procter & Gamble Company, The: *See—*
Minesinger, David Ellsworth; and Leslie, Thomas Foster, 4,009,793.
Produits Chimiques Pechiney-Saint Gobain: *See—*
Clair, Rene; and Correia, Yves, 4,010,215.
Produits Chimiques Ugine Kuhlmann: *See—*
Brouard, Claude Marie Henri Emile; Leroy, Jean Marie Louis; and Stiot, Jean-Pierre Henry, 4,010,151.
Professional Staff Association of the Los Angeles County Harbor General Hospital: *See—*
Parlow, Albert F., 4,010,256.
Progressive Dynamics, Inc.: *See—*
Kilbourn, Eugene L., 4,010,410.
Prohoroff, Jack P., to Hernandez, Armando C. Air vent particle filter cap. 4,009,724, Cl. 131-187.000.
Protective Treatments, Inc.: *See—*
Wenrick, Brian A., 4,010,297.
Provencher, Joseph H., to United States of America, Navy. Two dimensional array antenna. 4,010,474, Cl. 343-814.000.
Pryor, Timothy Reed. Method and apparatus for determining object dimension and other characteristics using diffraction waves. 4,009,965, Cl. 356-109.000.
Pulak, Richard P., to UOP Inc. Regeneration apparatus. 4,010,003, Cl. 23-288.00B.
Purolator, Inc.,: *See—*
Hammer, Kurt Finn, 4,009,714.
Quesada, Camilo, to SCM Corporation. Anhydrous solvent separation in production of polyol monoacylates. 4,010,183, Cl. 260-428.500.
Raasch, Hans, to Schlafhorst & Co. Traveling holder for textile coils. 4,009,919, Cl. 312-268.000.
Raceway Components, Inc.: *See—*
Kohaut, John E., 4,010,314.
Racin, Charles. Disc brake piston puller. 4,009,515, Cl. 29-265.000.
Rader, James E. Three-dimensional word game apparatus. 4,009,882, Cl. 273-135.00D.
Radlmann, Eduard; Schaffner, Heinz; Lorenz, Gunter; and Nischk, Gunther, to Bayer Aktiengesellschaft. Solutions of new complex antimony compounds. 4,010,104, Cl. 252-8.100.
Rafferty, Edson H.: *See—*
Kletschka, Harold D.; Rafferty, Edson H.; and Clausen, Earl W., 4,009,719.
Rakowski, Arnold J.: *See—*
Bourbeau, Frank J.; Meredith, Barton L.; and Rakowski, Arnold J., 4,010,489.
Rama Corporation: *See—*
Simmons, Raymond L.; Williams, David E.; Hoyt, Edwin D.; and Davis, Eugene B., 4,009,713.
Williams, David E.; and Hoyt, Edwin D., 4,010,351.
Rambo, Sheldon I., to United States of America, Air Force. RF power amplifier parallel redundant system. 4,010,426, Cl. 330-53.000.
Ramler, Warren J., to PPG Industries, Inc. Ultraviolet light processor and method of exposing surfaces to ultraviolet light. 4,010,374, Cl. 250-492.00R.
Ramsauer, Otto; Dau, Heribert; Gumbmann, Willi; and Schulze, Ulrich, to Akzona Incorporated. Tufted carpet with woven ribbon backing of polyamide and polyester. 4,010,303, Cl. 428-95.000.
Ramseyer, Robert; and Novet, Hanspeter, to Werkzeugmaschinenfabrik Oerlikon-Buhrle AG. Ammunition container. 4,009,638, Cl. 89-34.000.
Ramstad, David L.: *See—*
Munro, James M.; Ramstad, David L.; and Getty, Paul M., 4,009,635.
Rand Corporation, The: *See—*
Marcum, Jess I., 4,010,469.
Randermann, Ervin, Jr.: *See—*
McGill, Howard L.; Randermann, Ervin, Jr.; and Musik, Olgierd J., 4,009,753.
Rarey, Charles R., to Jones & Laughlin Steel Corporation. Columbium-stabilized high chromium ferritic stainless steels containing zirconium. 4,010,049, Cl. 148-37.000.
Raschack, Manfred: *See—*
Binnig, Fritz; and Raschack, Manfred, 4,010,282.
Rau, Peter: *See—*
Jung, Wilfried; Kaden, Werner; and Rau, Peter, 4,010,069.
Ravier, Dominique; and Bouy, Pierre, to Rhone-Poulenc Industries. Novel electrode for electrolysis cell. 4,010,091, Cl. 204-290.00F.
Ravizza, Martino; and Abate-Daga, Giancarlo, to Ing. C. Olivetti & C., S.p.A. Fixing unit for electrostatic copiers. 4,009,953, Cl. 355-3.00R.
Rawlings, John L.: *See—*
Boyan, Gerard E.; and Rawlings, John L., 4,009,948.
Raymond Lee Organization, Inc., The: *See—*
Miller, Hallie E.; and Kittrell, Nancy W., 4,009,819.
RCA Corporation: *See—*
Cable, Walter Lester, 4,009,851.
DiMeo, Franklin Roosevelt; and Bachman, William John, 4,010,473.
Dingwall, Andrew Gordon Francis; and Rosenthal, Bruce David, 4,010,425.
Faughnan, Brian Wilfred; and Crandall, Richard Seely, 4,009,935.
Firester, Arthur Herbert, 4,009,933.
Hernqvist, Karl Gerhard, 4,010,363.
Levine, Peter Alan, 4,010,319.
Pinch, Harry Louis; Abeles, Benjamin; and Gittleman, Jonathan Isaac, 4,010,312.
Riddle, George Herbert Needham, 4,010,318.
Salvatore, Leonard Robert, 4,010,418.
Sauer, Donald Jon, 4,010,485.
Rebuschat, Karl, to Demag Aktiengesellschaft. Apparatus for treatment of rolled wire. 4,009,869, Cl. 266-112.000.
Red Wing Products Inc.: *See—*
Coon, Herb, 4,009,807.
Reece, Albert Benjamin John: *See—*
Lorch, Hugh Olaf; and Reece, Albert Benjamin John, 4,010,393.
Lorch, Hugh Olaf; and Reece, Albert Benjamin John, 4,010,394.
Reese, Gunter; and Osberghaus, Rainer, to Henkel & Cie G.m.b.H. Process of suppressing odors employing deodorants containing esters of citric acid. 4,010,253, Cl. 424-47.000.
Reeves, George I.; and Keegan, Jack J., to Beckman Instruments, Inc. Advance and retard timing light. 4,010,414, Cl. 324-16.00T.
Reeves, George I.; and Chism, Hoke R., Jr., to Beckman Instruments, Inc. Sweep generator for engine analyzers. 4,010,415, Cl. 324-16.00S.

Reeves, George I.; and Richards, Donald D., to Beckman Instruments, Inc. Ignition analyzer time base. 4,010,419, Cl. 324-16.00S.

Regie Nationale des Usines Renault: *See—*
Lombard, Claude, 4,010,407.

Regnier, Gilbert; Canevari, Roger; Laubie, Michel; and Poignant, Jean-Claude, to Science Union et Cie, Societe Francaise de Recherche Medical. Benzodioxole compounds. 4,010,267, Cl. 424-250.000.

Rehm, William A.: *See—*
Griffin, Phil H., III; Rehm, William A.; Talley, Martin L.; Sharki, Martin J.; and Renfro, Woodrow E., 4,010,012.

Reicks, Allen V., to Iowa State University Research Foundation, Inc. Soybean harvester. 4,009,557, Cl. 56-98.000.

Reid, David Eric: *See—*
Adlam, Christopher; and Reid, David Eric, 4,010,257.

Reif, Robert B., to United States of America, Army. Electro-inertial air cleaner. 4,010,011, Cl. 55-127.000.

Reiner, Udo; and Zilg, Jochen, to Siemens Aktiengesellschaft. Satellite communications transmission apparatus and method. 4,010,420, Cl. 325-4.000.

Renfro, Woodrow E.: *See—*
Griffin, Phil H., III; Rehm, William A.; Talley, Martin L.; Sharki, Martin J.; and Renfro, Woodrow E., 4,010,012.

Rengo Co., Ltd.: *See—*
Tokuno, Masatero, 4,010,061.

Renis, Harold E.; and Skaletzky, Louis L., to Upjohn Company, The. Antiviral quinazoline compositions and methods of use. 4,010,269, Cl. 424-251.000.

Renner, Alfred, to Ciba-Geigy AG. Process for the manufacture of urea-formaldehyde condensation polymers containing sulpho groups. 4,010,132, Cl. 260-29.40R.

Repenning, William, to Natico, Inc. Method for producing a drum type container with air cushion. 4,010,230, Cl. 264-25.000.

Ress, Thomas I.; and Nolde, George V., to Kreidl Chemico Physical K.G. Direct acting plasma accelerator. 4,010,396, Cl. 313-231.300.

Rhone-Poulenc Industries: *See—*
Gruffaz, Max; and Locatelli, Jean-Louis, 4,010,220.
Ravier, Dominique; and Bouy, Pierre, 4,010,091.

Rhone-Poulenc S.A.: *See—*
Aviron-Violet, Paul, 4,010,181.

Rhone-Progil: *See—*
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Riasoli, Giovanni: *See—*
Giraldi, Pier Nicola; Nannini, Giuliano; Riasoli, Giovanni; Spelta, Anna; and Contone, Aurelio, 4,010,274.

Rich, Dennis E.: *See—*
Olney, Frederick D., Jr.; and Rich, Dennis E., 4,009,683.

Richard, Jeanne-Marie Monique, to Etat Francais. Flexion-plate hydrophones. 4,010,441, Cl. 340-10.000.

Richards, Donald D.: *See—*
Reeves, George I.; and Richards, Donald D., 4,010,419.

Richmond, Colin: *See—*
de Aza, Salvador; Richmond, Colin; and White, James, 4,010,039.

Rickly, Samuel E.: *See—*
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Ricoh Co., Ltd.: *See—*
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Suzuki, Shigeru; Iwamoto, Minoru; Noguchi, Koichi; Omi, Kyoji; and Nishikawa, Tatsuo, 4,009,957.

Riddle, George Herbert Needham, to RCA Corporation. Probe forming electron optical column having means for examining magnified image of the probe source. 4,010,318, Cl. 358-178.000.

Riebel, Hans-Jochem: *See—*
Hofer, Wolfgang; Maurer, Fritz; Riebel, Hans-Jochem; Rohe, Lothar; and Homeyer, Bernhard, 4,010,157.

Rieter Machine Works, Ltd.: *See—*
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Riggs, Robert S.: *See—*
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Ringwood, Robert C., Jr.: *See—*
Ejk, Adam J.; and Ringwood, Robert C., Jr., 4,010,138.

Riordan, Edward D.; and Menges, John R., to Joyal Products, Incorporated. Apparatus for transferring a workpiece over a rough surface. 4,010,344, Cl. 219-80.000.

Riparbelli, Carlo, to United States of America, Air Force. Discriminating sensor for contact fuzing. 4,009,662, Cl. 102-70.20R.

Rippel, Riemond Henry, Jr.: *See—*
Johnson, Edwin Samuel; and Rippel, Riemond Henry, Jr., 4,010,261.

Rittenbach, Otto: *See—*
Fishbein, William; Olesch, Reinhard; and Rittenbach, Otto, 4,010,468.

Ritzerfeld, Gerhard. Electrostatic copier. 4,009,954, Cl. 355-7.000.

Ritzerfeld, Gerhard. Electrostatic or xerographic copying or duplicating machine with built-in arrangement for cutting a sheet along a selected line or lines. 4,009,956, Cl. 355-13.000.

Robbins Company, The: *See—*
Robbins, Richard J.; and Adami, Hans A., 4,009,909.

Robbins, Elmer A.: *See—*
Loy, John S.; Hankel, Melvin C.; and Robbins, Elmer A., 4,009,800.

Robbins, Richard J.; and Adami, Hans A., to Robbins Company, The. Upward tunneling. 4,009,909, Cl. 299-56.000.

Robbins, Thomas R.: *See—*
Wachter, William J.; and Robbins, Thomas R., 4,010,375.

Robert Bosch G.m.b.H.: *See—*
Eckert, Konrad, 4,009,986.

Robinson, Glen P., Jr.; and Shelton, Samuel V., to Scientific-Atlanta, Inc. Combined loop free-piston heat pump. 4,009,587, Cl. 62-116.000.

Rockerath, John L.; and Schreck, Harold J., to Jetsew, Inc. Sewing machine material preassembly system. 4,009,672, Cl. 112-262.000.

Rodkin, Valentin Vasilievich: *See—*
Bogdanov, Alexandr Antonovich; Rodkin, Valentin Vasilievich; and Chudinovsky, Anatoly Andreevich, 4,010,392.

Roe, Inc.: *See—*
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Roehrman, Kenneth Earl; and van Pul, Bernardus I. C. F., to Motorola, Inc. Semiconductor wafer having machine readable indicies. 4,010,355, Cl. 235-61.11E.

Roelofs, Wendell L.: *See—*
Carde, Ring T.; Kochansky, Jan P.; and Roelofs, Wendell L., 4,010,255.

Rogers, Jack. Combination cracker tray and waste container. 4,009,818, Cl. 229-23.00R.

Rohde, Robert P.; Christ, John H.; and Anderson, Stanley E., Jr., to General Motors Corporation. Compact power steering gear. 4,009,641, Cl. 91-375.00A.

Rohe, Hermann: *See—*
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Rohe, Lothar: *See—*
Hofer, Wolfgang; Maurer, Fritz; Riebel, Hans-Jochem; Rohe, Lothar; and Homeyer, Bernhard, 4,010,157.

Rohm and Haas Company: *See—*
Bollinger, Joseph M.; Hanauer, Richard H.; and Machleder, Warren H., 4,010,007.
Drake, Billy B., 4,010,073.
Nemec, Joseph W.; and Stewart, Thomas, 4,010,082.

Rohr, Willy; and Smutny, Viktor, to Ruti Machinery Works Ltd. Filling thread stop motion device for a loop. 4,009,737, Cl. 139-370.200.

Rohringer, Peter: *See—*
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Rolfe, Nicholas: *See—*
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Rooney, Clarence S.: *See—*
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Roper Corporation: *See—*
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Roscher, Gunter; and Schmitz, Heinz, to Hoechst Aktiengesellschaft. Process for the preparation of allyl acetate. 4,010,198, Cl. 260-497.00A.

Rose, John Brewster, to Imperial Chemical Industries Limited. Aromatic polymers containing ketone linking groups and process for their preparation. 4,010,147, Cl. 260-79.30M.

Rose, Leroy: *See—*
Leach, Bruce E.; and Rose, Leroy, 4,010,099.

Rosen, Stanley R. Universal mold tooling system for thermoforming molds. 4,009,981, Cl. 425-388.000.

Rosenthal, Bruce David: *See—*
Dingwall, Andrew Gordon Francis; and Rosenthal, Bruce David, 4,010,425.

Rosinger, Herbert P.: *See—*
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Ross, Adma Schneller: *See—*
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Rossborough, John C., to Merchants National Bank of Manchester. Apparatus for pipe-to-manhole sealing. 4,009,545, Cl. 52-173.00R.

Rossel, Helmut: *See—*
Engels, Uwe; Frohberg, Gunther; Klotzbach, Peter; Kuhlen, Ernst; and Rossel, Helmut, 4,009,700.

Rossell, Allen J., to Burroughs Corporation. Synchronous switch control circuit. 4,010,386, Cl. 307-252.0UA.

Rothert, Kenneth, to Chevron Research Company. Corrosion-retarding functional fluid. 4,010,106, Cl. 252-32.70E.

Rothert, Kenneth, to Chevron Research Company. Corrosion-inhibiting functional fluid. 4,010,107, Cl. 252-32.70E.

Roussel-UCLAF: *See—*
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Rowlands, David Alun: *See—*
Matharu, Saroop Singh; Rowlands, David Alun; Westwood, Robert; and Taylor, John Bodenham, 4,010,268.

Ruehrwein, Robert A. Process for production of III–V compound crystals. 4,010,045, Cl. 148-174.000.

Ruf, Max; and Steinwart, Johannes, to Audi NSU Auto Union Aktiengesellschaft. Internal combustion engine having provisions for heating the fuel-air mixture by means of the exhaust. 4,009,701, Cl. 123-122.0AC.

Rugge, Henry Ferdinand: *See—*
Link, William Trevor; Rugge, Henry Ferdinand; and Jansen, William David, 4,009,709.

Ruhl, George A. Self contained electronic digital thermometer. 4,009,615, Cl. 73-362.0AR.

Runyan, Kenneth R.; Honnert, Quentin E.; and Porter, Ronald H., to Multifold-International, Inc. Machine for feeding stacked articles. 4,009,789, Cl. 214-6.00S.

Russell, David D.; and Shkapenko, George, to Samuel Moore and

Company. Polyol blends and polyurethane prepared therefrom. 4,010,146, Cl. 260-77.5AM.

Russell, Jack C.; and Russell, John F. Apparatus for distributing fluids below soil surfaces. 4,009,666, Cl. 111-6.000.

Russell, John F.: *See—*
Russell, Jack C.; and Russell, John F., 4,009,666.

Russin, Nicholas C.; Tershansy, Ronald A.; and Kibler, Charles J., to Eastman Kodak Company. Process and catalyst inhibitor systems for preparing synthetic linear polyesters. 4,010,145, Cl. 260-75.00R.

Ruti Machinery Works Ltd.: *See—*
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Ryder International Corporation: *See—*
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S & C Electric Company: *See—*
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Sabashi, Toshihiko, to Kayabakogyo-Kabushiki-Kaisha. Hydraulic swing motor. 4,009,639, Cl. 91-25.000.

Sabet, Huschang. Port control arrangement in a rotary-piston internal-combustion engine. 4,009,691, Cl. 123-8.470.

Sacht, Hans Otto, to Gebrueder Welger. Machine for forming a round bale of fibrous agricultural material. 4,009,653, Cl. 100-88.000.

Saggese, Michael Frank; Levine, Gerald; and Beckman, William E., to Tenneco Chemicals, Inc. Flexible printing plate. 4,010,128, Cl. 260-23.70M.

Sagmuller, Joseph R.: *See—*
Stowell, William R.; and Sagmuller, Joseph R., 4,010,089.

Saint-Gobain Industries: *See—*
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St. Paul's Engineering Company: *See—*
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Saito, Junichi: *See—*
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Saito, Kazuo, deceased: *See—*
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Saito, Nobuko, administratrix: *See—*
Inouye, Shigeharu; Shomura, Takashi; Kojima, Michio; Ogawa, Yasuaki; Watanabe, Hiroshi; Kondo, Yasumitsu; Saito, Kazuo, deceased; Yamada, Yujiro; and Niida, Taro, 4,010,155.

Sakai, Yasuo; and Nakagawa, Yasuhiko, to Nissan Motor Co., Ltd. Torch-ignition reciprocating internal combustion engine. 4,009,692, Cl. 123-32.0SP.

Sakamaki, Hisashi: *See—*
Komori, Shigehiro; Sakamaki, Hisashi; Hattori, Hiroyuki; Iida, Toshihide; Miyamoto, Koichi; and Umezawa, Kazumi, 4,009,955.

Sakamoto, Takashi: *See—*
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Sakimoto, Seiitiro: *See—*
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Salamon, Karlene W.: *See—*
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Salinger, Fred G., to Electro-Therm, Inc. Heater rod support bracket for radiant heater assembly. 4,010,348, Cl. 219-347.000.

Salvatore, Leonard Robert, to RCA Corporation. Transistor circuits. 4,010,418, Cl. 324-158.00T.

Sampson Corporation, The: *See—*
Burstein, Albert H.; and Heiple, Kingsbury G., 4,009,712.

Samuel Moore and Company: *See—*
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Sandco Ltd.: *See—*
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Sandiford, Burton B., to Union Oil Company of California. Selectively controlling the flow of fluids through subterranean formations. 4,009,755, Cl. 166-270.000.

Sandl, Dieter: *See—*
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Sankyo Company Limited: *See—*
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Sanno, Yasushi: *See—*
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Sano, Namito; and Tsuchiya, Yu, to Coca-Cola Co., The. Cargo conveying apparatus on motor truck. 4,009,792, Cl. 214-83.300.

Santucci, Donald G.: *See—*
Santucci, Kenneth E.; and Santucci, Donald G., 4,009,845.

Santucci, Kenneth E.; and Santucci, Donald G. Unreel reinforcer for dispensing wire. 4,009,845, Cl. 242-129.700.

Sarle, Charles Richard, to Wallace-Murray Corporation. Turbocharger lubrication and exhaust system. 4,009,972, Cl. 417-407.000.

Sasagawa, Syuzo: *See—*
Ninomiya, Tomokazu; Sasagawa, Syuzo; Washio, Hideo; and Hirata, Nobuhiro, 4,009,975.

Sasajima, Kikuo: *See—*
Maruyama, Isamu; Nakao, Masaru; Sasajima, Kikuo; Inaba, Shigeho; and Yamamoto, Hisao, 4,010,280.

Sato, Takayoshi, to Yugenkaisha Sato Kenkyusho. Control circuit for automatically controlling a diaphragm of a camera. 4,010,480, Cl. 354-43.000.

Sato, Takefumi; and Dohi, Yuji, to Sharp Kabushiki Kaisha. Alarm system for a skid control system. 4,009,914, Cl. 303-92.000.

Satoh, Ryosuke: *See—*
Fujiwhara, Mitsuto; Endo, Takaya; and Satoh, Ryosuke, 4,010,035.

Satoh, Tsuyoshi, to Mitsubishi Denki Kabushiki Kaisha. Elevator control system. 4,009,766, Cl. 187-29.00R.

Satz, Ronald W., to Transpower Corporation. Rotary hot gas regenerative engine. 4,009,573, Cl. 60-519.000.

Sauer, Donald Jon, to RCA Corporation. Charge-coupled device input circuits. 4,010,485, Cl. 357-24.000.

Sauerwein, Kurt: *See—*
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Sauter, Robert: *See—*
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Sayer, Wayne L.; and Wright, Pat. Method and apparatus for testing a subsurface formation for fluid retention potential. 4,009,609, Cl. 73-155.000.

Schabacher, Werner: *See—*
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Schablonen Technik Kufstein Ges.m.b.H.: *See—*
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Schaffner, Heinz: *See—*
Radlmann, Eduard; Schaffner, Heinz; Lorenz, Gunter; and Nischk, Gunther, 4,010,104.

Schally, Andrew V.; and Coy, David H. [D-Trp^6]-LH-RH and intermediates therefor. 4,010,125, Cl. 260-8.000.

Schapker, Richard L.: *See—*
Chiang, Alice M.; Denley, Brian W.; and Schapker, Richard L., 4,009,516.

Schatton, Paul; and Hellmund, Wolfgang, to Mannesmannrohren-Werke AG. Tubing or casing joint. 4,009,893, Cl. 285-110.000.

Schaumburg, Ernest C., to Standard Oil Company. Battery vent. 4,010,044, Cl. 429-82.000.

Scheck, Paul, to J. Bobst & Fils, S.A. Sheet carrying apparatus. 4,009,878, Cl. 271-272.000.

Scherer, Henry W., to S & C Electric Company. Terminator member for fusible element of a high voltage fuse. 4,010,438, Cl. 337-232.000.

Schexnayder, Lawrence F., to Caterpillar Tractor Co. Throttling slot configuration for a valve spool. 4,009,864, Cl. 251-282.000.

Schiessler, Siegfried; Spietschka, Ernst; and Tronich, Wolfgang, to Hoechst Aktiengesellschaft. Process for the purification of copper phthalocyanine. 4,010,180, Cl. 260-314.500.

Schiessler, Siegfried: *See—*
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Schlachter, Kurt, to Kramer & Grebe GmbH & Co. KG Maschinen-und Modellfabrik. Device for packaging of goods. 4,009,552, Cl. 53-86.000.

Schlaepfer, Hans, to Ciba-Geigy Corporation. Process and product of optical brightening with quaternized benzofuranyl-benzimidazoles. 4,009,994, Cl. 8-1.00W.

Schlafhorst & Co.: *See—*
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Schloger, Borge: *See—*
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Schlumberger Technology Corporation: *See—*
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Schmidt, Dietrich F., to Capitol Products Corporation. Storage locker. 4,009,796, Cl. 220-84.000.

Schmitt, Paul: *See—*
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Schmitz, Frederick William: *See—*
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Schmitz, Heinz: *See—*
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Schnabel, Ernst. Pressure hose. 4,009,733, Cl. 138-103.000.

Schneider, Alan A., to Catalyst Research Corporation. Lithium-iodine cells and method for making same. 4,010,043, Cl. 29-523.200.

Schneider, Georg, to Koenig & Bauer Aktiengesellschaft. Mechanism for securing printing plate clamping devices on forme cylinders. 4,009,659, Cl. 101-415.100.

Schnyder, Auxilius P. Wood chipping apparatus. 4,009,837, Cl. 241-93.000.

Schoenfeld, David Robert: *See—*
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Scholl, Charles H., to Nordson Corporation. Method and apparatus for pumping viscous material. 4,009,974, Cl. 418-181.000.

Scholl, Charles H.: *See—*
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Schram, Irwin Herbert: *See—*
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Schreck, Harold J.: *See—*
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Schreyer, Kenneth D., to Columbus McKinnon Corporation. Hoist brake construction featuring cam devices. 4,009,770, Cl. 188-82.740.
Schroder, Rolf: *See—*
Muller, Hermann; Sandl, Dieter; Sylla, Jurgen; and Schroder, Rolf, 4,010,062.
Schul, Herbert, to Heraeus-Schott Quarzschmelze GmbH. Apparatus for making fused silica tubing. 4,010,022, Cl. 65-277.000.
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Science Union et Cie, Societe Francaise de Recherche Medical: *See—*
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Scientific-Atlanta, Inc.: *See—*
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SCM Corporation: *See—*
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Scott, Kenneth W.; and Calderon, Nissim, to Goodyear Tire & Rubber Company, The. Preparation of graft, block and crosslinked unsaturated polymers and copolymers by olefin metathesis. 4,010,224, Cl. 260-878.00R.
Scott Paper Company: *See—*
Bonanno, Frank Joseph; Kaiser, Richard B.; and Kroon, Pieter J., 4,009,657.
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Sealed Power Corporation: *See—*
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Seaman, Jack L., to General Motors Corporation. Carburetor. 4,010,228, Cl. 261-23.00A.
Sebek, Oldrich K.: *See—*
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Secor, Robert B.; Van Nordstrand, Robert A.; and Pegg, David R., to Filtrol Corporation. Fluid cracking catalysts. 4,010,116, Cl. 252-455.00Z.
Segawa, Takashi, to Shimano Industrial Company, Limited. Assembly of chain sprockets and cranks for bicycle. 4,009,621, Cl. 74-243.0DR.
Seki, Kohji: *See—*
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Sepmeyer, Ludwig W.: *See—*
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Setzer, William C.; Lanam, Richard D.; Winter, Joseph; and Graham, Douglas L., to Swiss Aluminium Ltd. Method of extruding aluminum base alloys. 4,010,046, Cl. 148-11.50A.
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Shackle, Dale Richard; and Schwab, Gerhart. Process for the production of self-contained carbonless copy record sheets. 4,010,292, Cl. 427-150.000.
Shah, Aroon C. Automotive burglar alarm with gas siphoning detector. 4,010,444, Cl. 340-63.000.
Sharki, Martin J.: *See—*
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Sharon Manufacturing Company: *See—*
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Sharp, Andrea H. Baby pack. 4,009,808, Cl. 224-6.000.
Sharp, Bernard C., to Parker-Hannifin Corporation. Wiper blade unit with fastening clip. 4,009,503, Cl. 15-250.420.
Sharp Kabushiki Kaisha: *See—*
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Shaughnessey, Paul Eugene, to American Cyanamid Company. Synthetic organic flocculants to clarify raw sugar liquor. 4,009,706, Cl. 127-48.000.
Sheldon, Wesley E. Safety leg for a chair. 4,009,904, Cl. 297-217.000.
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Sheppard, John D.; and Tong, Long S., to United States of America, Energy Research and Development Administration. Apparatus for monitoring two-phase flow. 4,009,614, Cl. 73-195.000.
Shibahara, Tetsuya: *See—*
Matsui, Kazuo; Shigematsu, Taichiro; Shibahara, Tetsuya; and Nakazawa, Makoto, 4,010,182.
Shigehara, Katumi. Terminals for coil bobbin. 4,010,435, Cl. 336-192.000.
Shigematsu, Taichiro: *See—*
Matsui, Kazuo; Shigematsu, Taichiro; Shibahara, Tetsuya; and Nakazawa, Makoto, 4,010,182.
Shih, Chi-Kai, to Du Pont de Nemours, E. I., and Company. Blends of copolyesters and ethylene/carboxylic acid copolymers which are at least ten percent neutralized. 4,010,222, Cl. 260-873.000.
Shiley Laboratories, Inc.: *See—*
Crandall, Norman C., 4,009,720.
Shima, Masatoshi: *See—*
Faggin, Federico; Shima, Masatoshi; and Mazor, Stanley, 4,010,449.
Shimamoto, Takeshi, to Kawasaki Jukogyo Kabushiki Kaisha. Safety device for a motorcycle. 4,010,379, Cl. 307-9.000.
Shimano Industrial Company, Limited: *See—*
Fujii, Yuji, 4,009,768.
Segawa, Takashi, 4,009,621.
Shimizu, Katsuhisa: *See—*
Matsuo, Kotaro; Shimizu, Katsuhisa; Hoshiba, Michimasa; and Chihara, Machio, 4,010,130.
Shimizu, Sadaichi, to K.K. Shimizu Seisakusho. Method of and apparatus for bending a double pipe. 4,009,601, Cl. 72-369.000.
Shimizu, Shinkichi: *See—*
Shiraishi, Tatsuo; Shimizu, Shinkichi; Ichihashi, Hiroshi; and Shindo, Tadashi, 4,010,238.
Shin Meiwa Industry Co., Ltd.: *See—*
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Shindo, Tadashi: *See—*
Shiraishi, Tatsuo; Shimizu, Shinkichi; Ichihashi, Hiroshi; and Shindo, Tadashi, 4,010,238.
Shio, Cheng. Automatic telephone dialer. 4,010,330, Cl. 179-90.00B.
Shioi, Shunsuke: *See—*
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Shiraga, Ken: *See—*
Toriya, Jun; and Shiraga, Ken, 4,010,197.
Shiraishi, Tatsuo; Shimizu, Shinkichi; Ichihashi, Hiroshi; and Shindo, Tadashi, to Sumitomo Chemical Company, Limited. Proces for selective removal of nitrogen oxides from waste gases. 4,010,238, Cl. 423-239.000.
Shirley, Gerald. Spindle adapter. 4,009,886, Cl. 274-10.00S.
Shiroki, Masami: *See—*
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Shook, William Blair, to Thurston, Inc. Water bottle cage. 4,009,810, Cl. 224-39.000.
Showa Denko Kabushiki Kaisha: *See—*
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Shuster, Edward J.: *See—*
Hall, John B.; Hruza, Denis E., Sr.; Shuster, Edward J.; Vock, Manfred Hugo; and Vinals, Joaquin Francisco, 4,010,286.
Sickles, James E., to PPG Industries, Inc. Electrostatic spray coating apparatus. 4,009,829, Cl. 239-15.000.
Siemens Aktiengesellschaft: *See—*
Aistleitner, Olaf, 4,009,923.
Frohmader, Sigrun; and Ziegler, Gunther, 4,010,047.
Jung, Wilfried; Kaden, Werner; and Rau, Peter, 4,010,069.
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Simmons, Raymond L.; Williams, David E.; Hoyt, Edwin D.; and Davis, Eugene B., to Rama Corporation. Nebulizer. 4,009,713, Cl. 128-193.000.

Simora, Ferdinand: *See—*
Schulze, Rudolf; Schumacher, Horst; and Simora, Ferdinand, 4,009,558.
Simpson, Bobby Rollene. Overload protection device. 4,010,457, Cl. 340-253.00A.
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Albert, William Charles; and Zoltan, Bart Joseph, 4,009,848.
King, John E.; and Watkins, Herbert W., 4,009,521.
Wear, John H., 4,009,669.
Wittler, Hilmar; and Martin, Adolf, 4,009,671.
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Singh, Balbir, to Scott Paper Company. Web accumulator. 4,009,814, Cl. 226-113.000.
Singleton, Harold C.: *See—*
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Sintokogio, Ltd.: *See—*
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Skrypek, John P.; Peters, Arnold; and Williams, Robert, to Sun Chemical Corporation. Can unloader. 4,009,776, Cl. 198-478.000.
Skvarenina, John A. Method and apparatus for preventing condensation from forming about the periphery of a freezer door. 4,009,586, Cl. 62-80.000.
Slivka, Lawrence P., to United States of America, Navy. Missile post-multiple-target resolution guidance. 4,010,467, Cl. 343-7.400.
Slovenska vysoka skola technika: *See—*
Zelnik, Andrej, 4,009,751.
Smale, Charles H.: *See—*
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Smiltneek, Ralmond J., to Uniplex, Inc. Sheet feeding mechanism. 4,009,876, Cl. 271-99.000.
Smith, Bob L., deceased (Adams, Capt. Allen Bond, executor), to United States of America, Army. Polarization rotator for phase array antennas. 4,010,471, Cl. 343-754.000.
Smith, Curtis P.; and Ulrich, Henri, to Upjohn Company, The. Process. 4,010,209, Cl. 260-606.50P.
Smith, Donald L., to Thrifty-Vent, Inc. Venting system for a gas-fired heating plant. 4,009,705, Cl. 126-307.00A.
Smith, Grover C.; and Smith, Thomas M., to Interstate Sports, Inc. Foot lever construction having controlled flexibility. 4,009,623, Cl. 74-512.000.
Smith, Leslie Harold, to Imperial Chemical Industries Limited. Alkanolamine derivatives. 4,010,189, Cl. 260-465.00D.
Smith, Marjorieann M. Trailer coupling. 4,009,889, Cl. 280-423.00R.
Smith, Richard L.: *See—*
Martin, Luther W.; and Smith, Richard L., 4,009,732.
Smith, Roy R.: *See—*
Bernard, James A.; and Smith, Roy R., 4,009,598.
Smith, Thomas M.: *See—*
Smith, Grover C.; and Smith, Thomas M., 4,009,623.
Smith, William Edward, to General Electric Company. Process for preparing tetrahydrofuran. 4,010,171, Cl. 260-346.10R.
Smrt, Thomas J. Geodesic dome. 4,009,543, Cl. 52-81.000.
Smutny, Viktor: *See—*
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Snyder, Benedict Stewart, II: *See—*
Moldovan, Michael Terrance, Jr.; Lindros, Charles Jerome; Wescott, Robert Dean; Snyder, Benedict Stewart, II; Cusimano, Richard John; and Kristan, Michael, 4,010,353.
Snyman, Mattheus Johannes. Accelerometers. 4,009,619, Cl. 73-517.00R.
Sobel, Jay E., to UOP Inc. Maintaining HF solubility in alkylation isobutane recycle. 4,010,218, Cl. 260-683.480.
Societe Anonyme dite: L'Oreal: *See—*
Kalopissis, Gregoire; and Bugaut, Andree, 4,010,200.
Koulbanis, Constantin; Zabotto, Arlette; and Contamin, Jean-Claude, 4,010,254.
Societe Anonyme Etud: *See—*
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Societe d'Etudes, Recherches et Constructions Electroniques Sercel: *See—*
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Societe Nouvelle des Bennes Saphem: *See—*
Derain, Christian, 4,009,791.
Sojka, Nickolas J., to University of Virginia, The. Method and apparatus for handling wastes from small animal cages. 4,009,685, Cl. 119-22.000.
Sokolski, Walter T.: *See—*
Coats, John H.; Dietz, Alma; Dolak, Lester A.; Sebek, Oldrich K.; and Sokolski, Walter T., 4,010,075.
Solvay & Cie: *See—*
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Sombret, Claude: *See—*
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Souma, Ikuo, to Canon Kabushiki Kaisha. Method of preventing evaporation of liquid on an image-bearing member. 4,010,288, Cl. 427-15.000.
Southern Webbing Mills, Inc.: *See—*
Wall, Cothran D.; and Overly, John L., 4,009,597.
Special Metals Corporation: *See—*
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Spellman, Michael P. Garbage can and lid tie down apparatus. 4,009,897, Cl. 292-258.000.
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Spreckelmeyer, Bernhard; Guth, Hans; Schabacher, Werner; and Rohe, Hermann, to Bayer Aktiengesellschaft. Production of hydrogen fluoride and calcium sulfate. 4,010,245, Cl. 423-485.000.
Staats, Henry N.; and Newcomb, Robert K., to General Binding Corporation. Bookbinding system. 4,009,498, Cl. 11-1.0AD.
Stadigh, Hans-Goran, to Linden-Alimak AB. Magnetically actuated locking system for elevator doors. 4,009,767, Cl. 187-31.000.
Stahle, Helmut: *See—*
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Stampfli, Harald, to Lucifer S.A. Electromagnetic actuator comprising a plunger core. 4,010,390, Cl. 310-30.000.
Stan, Aurel V.: *See—*
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Stanfill, Gary Lee, to Midway Fishing Tool Co. Bottom discharge hopper seal. 4,009,907, Cl. 298-27.000.
Stanford, James R.: *See—*
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Stange, William C., to United States of America, National Aeronautics and Space Administration. Cyclical bi-directional rotary actuator. 4,010,455, Cl. 340-224.000.
Star Industries, Inc.: *See—*
Ashton, Walter G., 4,009,500.
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Stauffer Chemical Company: *See—*
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Stratton, Michael K.: *See—*
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Suga, Tsuneo; Kishi, Ken-ichi; Korematsu, Shinobu, Kanbe, Masaru; and Takahashi, Toshiaki, to Konishiroku Photo Industry Co., Ltd. Lith-type silver halide photosensitive material containing a p-benzoquinone derivative. 4,010,036, Cl. 96-66.300.
Sugihara, Hirosada; Watanabe, Masazumi; Motohashi, Michio; Nishikawa, Masao; and Sanno, Yasushi, to Takeda Chemical Industries, Ltd. 5,6-Dihydroxy aminotetralol compounds. 4,010,202, Cl. 260-573.000.
Sukup, Eugene G. Grain drying systems. 4,009,520, Cl. 34-233.000.
Sullivan, Dennis W., to Parker-Hannifin Corporation. Coiled tubing. 4,009,734, Cl. 138-125.000.
Sumitomo Chemical Company, Limited: *See—*
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Suslick, Kenneth S., to United States of America, Energy Research and Development Administration. Isotope separation by photochromatography. 4,010,100, Cl. 55-67.000.
Suzaki, Kuniyoshi, to Canon Kabushiki Kaisha. Motion picture projection apparatus with film feeding speed changing apparatus. 4,009,950, Cl. 352-166.000.
Suzuki, Koji, to Canon Kabushiki Kaisha. Thermographic camera. 4,010,367, Cl. 250-334.000.
Suzuki, Sadao, to Sony Corporation. Sensing circuits. 4,010,486, Cl. 357-25.000.
Suzuki, Shigeru; Iwamoto, Minoru; Noguchi, Koichi; Omi, Kyoji; and Nishikawa, Tatsuo, to Ricoh Co., Ltd. Copy paper feed system. 4,009,957, Cl. 355-14.000.
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Sweet, Philip J.; Hamlet, Buck C.; and Sweet, David L., to American Carrier Equipment, Inc. Metering gate for metering a fluid material as it is discharged from a hopper. 4,009,906, Cl. 298-27.000.
Swered, Paul; and Girard, Mary Anne, to Betz Laboratories, Inc. Synergistic compositions containing a polyoxyethylene sorbitol hexaoleate and their use. 4,010,277, Cl. 424-298.000.
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Takahashi, Yasuo, to Asahi Kogaku Kogyo Kabushiki Kaisha. Miniature and large aperture retrofocus wide-angle lens. 4,009,944, Cl. 350-214.000.
Takai, Hiromitsu. Vents-making dispenser carton. 4,009,811, Cl. 225-7.000.
Takamatsu, Ikuo, to Yoshida Kogyo Kabushiki Kaisha. Carpet securing device. 4,009,505, Cl. 16-7.000.
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Tamura, Akinori: *See—*
Hayashida, Motoyuki; Wakamoto, Mutsuo; Tamura, Akinori; and Ikegami, Masafumi, 4,009,688.
Tamura, Tatsuo: *See—*
Yamada, Yasuo; Saito, Junichi; Tamura, Tatsuo; and Kurahashi, Yoshio, 4,010,281.
Tanaka, Junzo; Takami, Tsuyoshi; and Kai, Toshio, to Matsushita Electric Industrial Co., Ltd. Microwave ovens. 4,010,343, Cl. 219-10.55D.
Tanaka, Nobuyoshi: *See—*
Kobayashi, Yukio; Sakimoto, Seiitiro; and Tanaka, Nobuyoshi, 4,010,289.
Tanguy, Pierre; and Faivre, Andre, to Societe Anonyme Etud. Electrical appliance for making sorbet. 4,009,588, Cl. 62-126.000.
Tarrant, Robert C. Solderless terminal. 4,009,926, Cl. 339-276.00T.
Tarzia, Giorgio; and Panzone, Gianbattista, to Gruppo Lepetit S.p.A. Pyrrolo[3,4-d]pyrimidines and methods for their preparation. 4,010,159, Cl. 260-256.40F.
Tasaki, Yasutaka: *See—*
Mikami, Ichiro; Danno, Sadao; Uchida, Izuhiko; Tasaki, Yasutaka; Kugimoto, Junichi; and Fujitsu, Satoru, 4,010,206.
Tashman, Philip. Portable solid waste shredder. 4,009,838, Cl. 241-99.000.
Taylor, John Bodenham: *See—*
Matharu, Saroop Singh; Rowlands, David Alun; Westwood, Robert; and Taylor, John Bodenham, 4,010,268.
Taylor Manufacturing, Inc.: *See—*
Alinder, Gilbert L.; and Anderson, Lloyd E., 4,009,908.
Taylor, Michael Geoffrey Cleeve; Warman, Bloomfield James; and Hackett-Jones, Francis Charles, to GTE International Incorporated. Telephone intercommunication system incorporating improved dialing arrangement. 4,010,331, Cl. 179-99.000.
Taylor, Welton I. Device for use in the identification of microorganisms. 4,010,078, Cl. 195-139.000.
TDK Electronics Company, Limited: *See—*
Kubota, Yuichi; Umeki, Shinji; and Tokuoka, Yasumichi, 4,010,310.
TECCOR Electronics, Inc.: *See—*
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Negersmith, Kent M., 4,009,999.
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Morse, Robert L., 4,009,596.
Teledyne Avionics, a division of Teledyne Industries Inc.: *See—*
Ward, John W., 4,009,707.
Telefonaktiebolaget L M Ericsson: *See—*
Lind, Kurt Bertil Reinhold, 4,010,421.
Teletype Corporation: *See—*
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Krol, William S., 4,010,385.
Temple, William F., to Massey-Ferguson Inc. Height control for combine headers. 4,009,555, Cl. 56-10.200.
Tenneco Chemicals, Inc.: *See—*
Saggese, Michael Frank; Levine, Gerald; and Beckman, William E., 4,010,128.
Terada, Hideto: *See—*
Miura, Takashi; Terada, Hideto; Inoue, Takao; and Kubota, Hironobu, 4,009,747.
Terry, Alvah B.: *See—*
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Tershansy, Ronald A.: *See—*
Russin, Nicholas C.; Tershansy, Ronald A.; and Kibler, Charles J., 4,010,145.
Tesk, John A.; Severa, Henrietta M.; Dudek, Ronald P.; and Kosmos, Peter, to Howmedica, Inc. Bonding agent for fusing porcelain to nonprecious metal alloy. 4,010,048, Cl. 148-24.000.
Teterevkov, Anatoly Ivanovich: *See—*
Mosse, Alfred Lvovich; Pechkovsky, Vladimir Vasilievich; Teterevkov, Anatoly Ivanovich; Burov, Igor Sergeevich; Vilk, Jury Nikolaevich; Ershov, Vadim Andreevich; Chelnokov, Alexandr Antonovich; Yasko, Oleg Iosifovich; Bysjuk, Vladimir Vladimirovich; and Dzjuba, Elena Dmitrievna, 4,010,241.
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Armistead, Fontaine C., 4,010,462.
Texaco Inc.: *See—*
Mayer, Edward A., 4,009,702.
Tharpe, Bobby J.; and Graf, James C., to General Electric Company. Integrated electric generating and space conditioning system. 4,010,378, Cl. 290-2.000.
Thiele, Kurt; Von Bebenburg, Walter; and Posselt, Klaus, to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler. Acyl derivatives of substituted bis-arylalkylamino compounds. 4,010,191, Cl. 260-471.00C.
Thimons, Edward D.; and Kissell, Fred N., to United States of America, Interior. Mine ventilation control device. 4,009,649, Cl. 98-50.000.
Thomas & Betts Corporation: *See—*
Couto, Luis R., 4,009,514.
Narozny, Ronald S., 4,009,921.
Thomas, Dorsey O., Jr.; and Terry, Alvah B., to Monsanto Company. Apparatus for cutting polymer flake. 4,009,629, Cl. 83-355.000.
Thomas, Ian M., to Owens-Illinois, Inc. Preparation for potassium bicarbonate from potassium halide. 4,010,243, Cl. 423-424.000.
Thomas, Michael D., to Ryder International Corporation. Contact lens holder. 4,009,777, Cl. 206-5.100.
Thomas, Wayne A. Adjustable display standard. 4,009,532, Cl. 40-11.00A.
Thompson, Lawrence M., to Arbee Corporation, The. Drive belt. 4,009,620, Cl. 74-236.000.
Thompson, Paige W.; and Frank, James P., to General Electric Company. Toggle device. 4,010,337, Cl. 200-67.00D.
Thompson, Robert W., to Westinghouse Electric Corporation. Method and apparatus for testing dielectric adequacy and for indicating physical defects in a nonconducting material. 4,010,416, Cl. 324-54.000.
Thrifty-Vent, Inc.: *See—*
Smith, Donald L., 4,009,705.
Thumm, Heinz. Hydraulic motor for rotating the bucket of an excavating machine. 4,009,643, Cl. 91-492.000.
Thurston, Inc.: *See—*
Shook, William Blair, 4,009,810.
Tiedt, Uwe. Irrigation means for the uniform distribution of liquid. 4,009,832, Cl. 239-542.000.
Tienkamp, Engbert: *See—*
Verdijk, Leonardus Petrus Gerardus; and Tienkamp, Engbert, 4,009,941.
Tillman, William R., to Caterpillar Tractor Co. Blade control apparatus of a motor grader including wand vibration damping element. 4,009,758, Cl. 172-4.500.
Tochigi Canon Co., Inc.: *See—*
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Toda, Hideaki: *See—*
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Tokheim Corporation: *See—*
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Tokuno, Masatero, to Rengo Co., Ltd. Paper roll splicing method and apparatus. 4,010,061, Cl. 156-504.000.
Tokuoka, Yasumichi: *See—*
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Tokuyama Soda Kabushiki Kaisha: *See—*
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Tokyo Juki Kogyo Kabushiki Kaisha: *See—*
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Tolnai, Julius L., to Price Pfister Brass Mfg. Co. Composite lip seal for lavatory or sink valve. 4,009,863, Cl. 251-172.000.
Toman, Frank W., Jr.: *See—*
Murray, Donald L.; Lees, John N., Jr.; and Toman, Frank W., Jr., 4,010,096.
Murray, Donald L.; Lees, John N., Jr.; and Toman, Frank W., Jr., 4,010,097.
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Tong, Long S.: *See—*
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Top Roc Precast Corporation: *See—*
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Toray Industries, Inc.: *See—*
Aoyama, Toshikazu; Okasaka, Hotuma; and Kodama, Hiroshi, 4,010,219.
Oka, Takashi; Iwasaki, Hiroshi; and Kato, Eiichi, 4,010,055.
Toriya, Jun; and Shiraga, Ken, to Mitsubishi Chemical Industries Ltd. Process for producing diacetoxybutanes and butanediols. 4,010,197, Cl. 260-491.000.
Towmotor Corporation: *See—*
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Toyo Kogyo Co., Ltd.: *See—*
Hayashida, Motoyuki; Wakamoto, Mutsuo; Tamura, Akinori; and Ikegami, Masafumi, 4,009,688.
Toyota Jidosha Kogyo Kabushiki Kaisha: *See—*
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Transcodan Sven Husted-Andersen: *See—*
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Transpower Corporation: *See—*
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Trayes, Terence John, to Motorola, Inc. Fixture and system for handling plate like objects. 4,009,785, Cl. 214-1.0BT.
Tremblay, Maurice H.: *See—*
Brown, Perry H.; and Tremblay, Maurice H., 4,010,004.
Trevithick, Tony, to Daniel Woodhead, Inc. Hand lamp. 4,010,336, Cl. 200-51.00R.
Tronich, Wolfgang: *See—*
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TRW, Incorporated: *See—*
Zehren, James N., 4,009,756.
Tsay, Yaw Jenn; and Lin, Kuo-Chuan. Solar powered distilling device. 4,010,080, Cl. 202-83.000.
Tsuchiya, Yu: *See—*
Sano, Namito; and Tsuchiya, Yu, 4,009,792.
Tsuk, Andrew G., to American Home Products Corporation. Linear polyester salts. 4,010,196, Cl. 260-484.00A.
Tsutsumi, Shuji: *See—*
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Tucel Industries, Inc.: *See—*
Lewis, John C., Jr., 4,009,910.
Turner, Warren E.: *See—*
Dreibelbis, Richard C.; and Turner, Warren E., 4,009,806.
Tutein, Thomas R., to Chemed Corporation. Composition and method for dispersing high molecular weight flocculant polymers in water. 4,010,135, Cl. 260-29.6HN.
Tvede-Jensen, Oluf: *See—*
Pontoppidan, Jorgen; Sorensen, Erik Tue; and Nielsen, Erik Kjaer, 4,010,459.
Twin Disc, Incorporated: *See—*
Black, James B.; and Steinhagen, Horst G., 4,009,571.
Tyer, Robert C.; and Bruce, Larry C. Incinerator for combustible refuse. 4,009,667, Cl. 110-8.00A.
UBE Industries, Ltd.: *See—*
Mikami, Ichiro; Danno, Sadao; Uchida, Izuhiko; Tasaki, Yasutaka; Kugimoto, Junichi; and Fujitsu, Satoru, 4,010,206.
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Uemura, Yahiro; Uriyu, Katuhiro; and Funakoshi, Satoshi, to Green Cross Corporation, The. Method for purification and recovery of urokinase. 4,010,074, Cl. 195-66.00B.
Uijen, Antonius Johannes Mathijs, to U.S. Philips Corporation. Method of working flat articles. 4,009,540, Cl. 51-283.000.
Ule, Louis A. Programmed valve system for internal combustion engine. 4,009,695, Cl. 123-90.130.
Ulrich, Henri: *See—*
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Uniplex, Inc.: *See—*
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Uniroyal Inc.: *See—*
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Agriculture: *See—*
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Kay, Robert M., 4,010,463.
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Bakker, Martinus Antonius Maria; and Klerks, Leonardus Henricus, 4,010,083.
Bergen, Stephen Archbold, 4,009,964.
Boekkooi, Anton; Hurx, Adrianus Antonius; and van Lieshout, Johannes Maria Josephus, 4,009,987.
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Kools, Franciscus Xaverius Nicolaus Maria, 4,010,434.
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Mulder, Rudolf; and Wellinga, Kobus, 4,010,271.
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United States Steel Corporation: *See—*
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United Technologies Corporation: *See—*
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Universal Oil Products Company: *See—*
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University of Texas System, Board of Regents of the: *See—*
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Uemura, Yahiro; Uriyu, Katuhiro; and Funakoshi, Satoshi, 4,010,074.
Uson, Aurelio C. Penile prosthesis for the management of erectile impotence. 4,009,711, Cl. 128-79.000.
Valentine, Charles G., to Xerox Corporation. Educational device for learning fundamentals of engine operation. 4,009,524, Cl. 35-13.000.
Van Buskirk, Oral R.: *See—*
Doerner, William Allen; and Van Buskirk, Oral R., 4,009,576.
Vandenkieboom, John, to LaSalle Machine Tool, Inc. Electrically driven tool compensator. 4,009,968, Cl. 408-12.000.
Vanderlaan, Robert D., to Pneumo Corporation. Differential pressure sensing valve. 4,009,642, Cl. 91-464.000.
Van Doren, Fred M.: *See—*
Van Doren, George A., Jr., 4,010,285.
Van Doren, George A., Jr., to Van Doren, Fred M., a part interest. Concentrates for carbonated soft drinks. 4,010,285, Cl. 426-534.000.
Van Hook, Jack K., to United States of America, Navy. Acoustic signature simulation. 4,009,523, Cl. 35-10.400.
van Lieshout, Johannes Maria Josephus: *See—*
Boekkooi, Anton; Hurx, Adrianus Antonius; and van Lieshout, Johannes Maria Josephus, 4,009,987.
Vann, Roy R. Sand consolidation method. 4,009,757, Cl. 166-276.000.
Van Nordstrand, Robert A.: *See—*
Secor, Robert B.; Van Nordstrand, Robert A.; and Pegg, David R., 4,010,116.
van Pul, Bernardus I. C. F.: *See—*
Roehrman, Kenneth Earl; and van Pul, Bernardus I. C. F., 4,010,355.
Varlev, Ivan Stefanov, to Centralna Laboratoria Za Agrophysicheski Izsledvania. Hydrant construction for a soil irrigation system. 4,009,830, Cl. 239-204.000.
VEB Kombinat Fortschritt: *See—*
Schulze, Rudolf; Schumacher, Horst; and Simora, Ferdinand, 4,009,558.
Verdijk, Leonardus Petrus Gerardus; and Tienkamp, Engbert, to U.S. Philips Corporation. Color-separating prism arrangement of which some surfaces adjoin dichroic layers. 4,009,941, Cl. 350-173.000.
Vermes, Rudolf N.: *See—*
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Vertegaal, Jacobus Gerardus, to Stork-Brabant B.V. Cloth printer and method with feeder engaging warp threads. 4,009,656, Cl. 101-129.000.
Vescia, Michele: *See—*
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Victor Company of Japan, Limited: *See—*
Muraoka, Teruo; Nisikawa, Kazunori; and Seki, Kohji, 4,010,333.
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Vik, Albam M., to Dempco, Inc. Hydraulic coupler. 4,009,729, Cl. 137-614.050.
Vilk, Jury Nikolaevich: *See—*
Mosse, Alfred Lvovich; Pechkovsky, Vladimir Vasilievich; Teterevkov, Anatoly Ivanovich; Burov, Igor Sergeevich; Vilk, Jury Nikolaevich; Ershov, Vadim Andreevich; Chelnokov, Alexandr Antonovich; Yasko, Oleg Iosifovich; Bysjuk, Vladimir Vladimirovich; and Dzjuba, Elena Dmitrievna, 4,010,241.
Villari, John J., Jr.; and Paraschos, Charles. Sneaker with insole. 4,009,528, Cl. 36-44.000.
Vinals, Joaquin Francisco: *See—*
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Virani, Gopal J.; Misencik, John J.; and Wiley, Roy O., to Westinghouse Electric Corporation. Switch for electrical wall receptacle with ground fault protection. 4,010,431, Cl. 335-18.000.

Vock, Manfred Hugo: *See—*
Hall, John B.; Hruza, Denis E., Sr.; Shuster, Edward J.; Vock, Manfred Hugo; and Vinals, Joaquin Francisco, 4,010,286.

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von Piessen, Helmold; Fischer, Eberhard; and Schiessler, Siegfried, to Hoechst Aktiengesellschaft. Process for the regeneration of sulfuric acid. 4,010,240, Cl. 423-269.000.

Voronkov, Mikhail Grigorievich; Deryagina, Eleonora Nikolaevna; Chernyshev, Evgeny Andreevich; Savushkina, Valentina Ivanovna; Nakhmanovich, Anatoly Samuilovich; and Tabenko, Bella Moiseevna. Method of preparing aromatic and heterocyclic sulphides and disulphides. 4,010,210, Cl. 260-609.00D.

Vulcan Materials Company: *See—*
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W. C. Smith & Sons, Inc.: *See—*
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W. Schlafhorst & Co.: *See—*
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Wachter, William J.; and Robbins, Thomas R. Storage rack for nuclear fuel assemblies. 4,010,375, Cl. 250-507.000.

Wahle, Gunter; Dahlgrun, Rolf; and Ludszeweit, Dieter, to Hauni-Werke Korber & Co., KG. Method and machine for making cigarettes with composite fillers. 4,009,722, Cl. 131-39.000.

Waites, Stephen Peter, to EMI Limited. Automatic vehicle guidance systems. 4,010,409, Cl. 318-587.000.

Wakamoto, Mutsuo: *See—*
Hayashida, Motoyuki; Wakamoto, Mutsuo; Tamura, Akinori; and Ikegami, Masafumi, 4,009,688.

Walch, Horst, to Siemens Aktiengesellschaft. High temperature hot conductors. 4,010,118, Cl. 252-521.000.

Walch, Horst, to Siemens Aktiengesellschaft. High temperature hot conductors. 4,010,119, Cl. 252-521.000.

Walch, Horst, to Siemens Aktiengesellschaft. High temperature hot conductors. 4,010,120, Cl. 252-521.000.

Walch, Horst, to Siemens Aktiengesellschaft. High temperature hot conductors. 4,010,121, Cl. 252-521.000.

Walch, Horst, to Siemens Aktiengesellschaft. High temperature hot conductors. 4,010,122, Cl. 252-521.000.

Walderbach, Karl: *See—*
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Waldhofer, Reinhard, to Shell Internationale Research Maatschappij B.V. Apparatus for transferring fuel between spaces which are at differential pressures. 4,009,788, Cl. 214-17.00B.

Walker, Darrell W.; and Farha, Floyd E., Jr., to Phillips Petroleum Company. Oxidative dehydrogenation catalyst. 4,010,114, Cl. 252-437.000.

Walker, Jordan E. Variable value constant volume flow device. 4,009,826, Cl. 236-49.000.

Wall, Cothran D.; and Overly, John L., to Southern Webbing Mills, Inc. Elastic tape with ravel resistant edge and method of knitting. 4,009,597, Cl. 66-193.000.

Wallace-Murray Corporation: *See—*
Sarle, Charles Richard, 4,009,972.

Wallace, Walter, to Cushman Industries, Incorporated. Self-contained power chuck with centrifugally balanced jaws. 4,009,888, Cl. 279-1.00C.

Wallin, Erik Wilhelm, to Barracudaverken Aktiebolag. Heat welded joints between webs of reinforced plastic foil. 4,010,300, Cl. 428-61.000.

Walters, Leslie K., to General Motors Corporation. Rotary combustion engine exhaust gas recirculation system. 4,009,689, Cl. 123-8.130.

Walther, Gerhard: *See—*
Langbein, Adolf; Merz, Herbert; Walther, Gerhard; and Stockhaus, Klaus, 4,010,164.

Wang, Jin-Liang, to Goodyear Tire & Rubber Company, The. Laminates of plasticized PVC and acrylonitrile: alkyl acrylate copolymers. 4,010,305, Cl. 428-215.000.

Warczyglowa, Clarence A.: *See—*
Gruszka, Raymond F.; and Warczyglowa, Clarence A., 4,010,488.

Ward, Dennis J., to Universal Oil Products Company. Gas-vapor separation process and apparatus with low energy consumption. 4,010,010, Cl. 55-37.000.

Ward, John W., to Teledyne Avionics, a division of Teledyne Industries Inc. Automatic acoustic impedance meter. 4,009,707, Cl. 128-2.00Z.

Ward, John Wesley, Jr., to International Business Machines Corporation. Document transport device. 4,009,877, Cl. 271-272.000.

Warman, Bloomfield James: *See—*
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Washio, Hideo: *See—*
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Wassermann, Martin Wilhelm; and Meyer, Arnold Wilhelm, to CONDEA Petrochemie-Gesellschaft m.b.H. Method for making water dispersible aluminum hydroxide. 4,010,247, Cl. 423-626.000.

Watanabe, Hiroshi: *See—*
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B 48,560	4,002,772	Mar. 30, 1976	Jan. 11, 1977
B 54,859	4,000,101	Feb. 17, 1976	Dec. 28, 1976
B 59,512	3,999,216	Mar. 16, 1976	Dec. 21, 1976
B 71,613	4,008,393	Mar. 16, 1976	Feb. 15, 1977
B 73,017	4,001,879	Mar. 9, 1976	Jan. 4, 1977
B 78,315	3,982,192	Feb. 10, 1976	Sep. 21, 1976
B 79,099	3,982,177	Jan. 13, 1976	Sep. 21, 1976
B 97,259	3,999,614	Mar. 9, 1976	Dec. 28, 1976
B 105,006	4,007,074	Mar. 23, 1976	Feb. 8, 1977
B 111,130	4,001,380	Mar. 16, 1976	Jan. 4, 1977
B 150,142	3,981,767	Jan. 27, 1976	Sep. 21, 1976
B 160,045	3,983,446	Jan. 13, 1976	Sep. 28, 1976
B 160,099	3,987,221	Jan. 13, 1976	Oct. 19, 1976
B 163,463	3,981,659	Jan. 27, 1976	Sep. 21, 1976
B 167,470	4,001,101	Mar. 2, 1976	Jan. 4, 1977
B 181,208	4,001,391	Mar. 9, 1976	Jan. 4, 1977
B 200,759	3,986,872	Feb. 3, 1976	Oct. 19, 1976
B 208,916	3,987,106	Jan. 13, 1976	Oct. 19, 1976
B 214,925	3,997,648	Mar. 9, 1976	Dec. 14, 1976
B 223,678	3,989,159	Mar. 9, 1976	Nov. 2, 1976
B 231,416	4,000,054	Mar. 30, 1976	Dec. 28, 1976
B 236,342	4,001,182	Feb. 10, 1976	Jan. 4, 1977
B 248,240	3,983,556	Jan. 13, 1976	Sep. 28, 1976
B 257,143	4,000,111	Mar. 16, 1976	Dec. 28, 1976
B 270,274	3,982,223	Feb. 17, 1976	Sep. 21, 1976
B 270,351	3,997,893	Mar. 30, 1976	Dec. 14, 1976
B 271,743	4,001,195	Mar. 16, 1976	Jan. 4, 1977
B 276,026	3,992,405	Feb. 3, 1976	Nov. 16, 1976
B 279,415	4,000,697	Mar. 16, 1976	Jan. 4, 1977
B 279,969	3,986,073	Jan. 13, 1976	Oct. 12, 1976
B 281,162	4,009,481	Mar. 23, 1976	Feb. 22, 1977
B 283,941	3,995,313	Feb. 3, 1976	Nov. 30, 1976
B 288,757	4,001,072	Mar. 30, 1976	Jan. 4, 1977
B 301,143	3,991,107	Jan. 27, 1976	Nov. 9, 1976
B 302,160	3,985,774	Feb. 3, 1976	Oct. 12, 1976
B 306,668	3,985,713	Feb. 3, 1976	Oct. 12, 1976
B 307,698	3,993,763	Feb. 3, 1976	Nov. 23, 1976
B 308,659	3,981,947	Jan. 27, 1976	Sep. 21, 1976
B 311,450	3,988,976	Mar. 9, 1976	Nov. 2, 1976
B 313,280	4,003,591	Apr. 6, 1976	Jan. 18, 1977
B 326,211	3,988,272	Mar. 23, 1976	Oct. 26, 1976
B 328,116	4,000,774	Mar. 9, 1976	Jan. 4, 1977
B 330,719	4,001,121	Mar. 16, 1976	Jan. 4, 1977
B 330,736	3,996,299	Feb. 3, 1976	Dec. 7, 1976
B 332,442	4,001,231	Mar. 30, 1976	Jan. 4, 1977
B 333,110	3,989,867	Mar. 16, 1976	Nov. 2, 1976
B 333,247	4,001,201	Mar. 16, 1976	Jan. 4, 1977
B 333,838	4,006,263	Mar. 23, 1976	Feb. 1, 1977
B 336,754	3,989,805	Mar. 16, 1976	Nov. 2, 1976
B 337,823	4,002,746	Mar. 23, 1976	Jan. 11, 1977
B 339,194	3,982,215	Feb. 3, 1976	Sep. 21, 1976
B 339,446	4,001,067	Feb. 24, 1976	Jan. 4, 1977
B 340,170	4,000,444	Mar. 30, 1976	Dec. 28, 1976
B 347,661	3,999,218	Mar. 16, 1976	Dec. 21, 1976
B 348,433	3,984,405	Feb. 3, 1976	Oct. 5, 1976
B 349,370	3,989,684	Jan. 27, 1976	Nov. 2, 1976
B 351,455	4,001,309	Feb. 24, 1976	Jan. 4, 1977
B 354,959	3,995,996	Feb. 17, 1976	Dec. 7, 1976
B 356,187	3,981,222	Jan. 20, 1976	Sep. 21, 1976
B 357,526	4,001,319	Mar. 23, 1976	Jan. 4, 1977
B 358,260	3,989,661	Mar. 30, 1976	Nov. 2, 1976
B 358,427	3,989,896	Feb. 3, 1976	Nov. 2, 1976
B 359,901	3,981,729	Jan. 13, 1976	Sep. 21, 1976
B 363,565	4,004,821	Mar. 30, 1976	Jan. 25, 1977
B 364,797	3,996,131	Feb. 17, 1976	Dec. 7, 1976
B 367,305	3,998,640	Mar. 2, 1976	Dec. 21, 1976
B 367,621	3,989,589	Feb. 3, 1976	Nov. 2, 1976
B 369,221	3,985,834	Feb. 24, 1976	Oct. 12, 1976
B 370,309	3,989,640	Jan. 20, 1976	Nov. 2, 1976
B 371,095	4,005,074	Mar. 23, 1976	Jan. 25, 1977
B 371,635	4,010,290	Mar. 23, 1976	Mar. 1, 1977
B 371,912	3,995,738	Mar. 2, 1976	Dec. 7, 1976
B 372,016	3,989,685	Mar. 9, 1976	Nov. 2, 1976
B 372,232	4,000,967	Mar. 16, 1976	Jan. 4, 1977
B 372,722	3,998,925	Mar. 9, 1976	Dec. 21, 1976
B 373,354	3,989,870	Jan. 27, 1976	Nov. 2, 1976
B 374,553	4,008,394	Mar. 30, 1976	Feb. 15, 1977
B 374,588	3,985,899	Jan. 27, 1976	Oct. 12, 1976
B 378,513	3,981,750	Jan. 27, 1976	Sep. 21, 1976
B 378,760	4,001,477	Mar. 9, 1976	Jan. 4, 1977
B 379,177	3,981,976	Jan. 27, 1976	Sep. 21, 1976
B 381,006	4,009,447	Apr. 6, 1976	Feb. 22, 1977
B 381,709	3,984,587	Jan. 13, 1976	Oct. 5, 1976
B 381,985	3,990,775	Feb. 3, 1976	Nov. 9, 1976
B 383,697	4,008,211	Feb. 17, 1976	Feb. 15, 1977
B 384,225	3,998,523	Mar. 16, 1976	Dec. 21, 1976
B 384,330	3,985,613	Jan. 27, 1976	Oct. 12, 1976
B 384,654	3,992,681	Feb. 24, 1976	Nov. 16, 1976
B 385,024	3,994,911	Feb. 10, 1976	Nov. 30, 1976
B 385,483	3,993,684	Feb. 17, 1976	Nov. 23, 1976
B 385,631	3,982,924	Jan. 27, 1976	Sep. 28, 1976
B 386,257	3,981,915	Feb. 3, 1976	Sep. 21, 1976
B 386,673	3,993,717	Feb. 3, 1976	Nov. 23, 1976
B 386,828	3,992,440	Feb. 3, 1976	Nov. 16, 1976
B 387,337	D 243,157	Mar. 16, 1976	Jan. 25, 1977
B 389,155	4,000,970	Mar. 30, 1976	Jan. 4, 1977
B 389,304	3,986,829	Jan. 27, 1976	Oct. 19, 1976
B 390,031	3,985,799	Jan. 13, 1976	Oct. 12, 1976
B 390,408	3,992,426	Feb. 3, 1976	Nov. 16, 1976
B 390,979	4,003,850	Mar. 23, 1976	Jan. 18, 1977
B 391,473	3,988,370	Mar. 2, 1976	Oct. 26, 1976
B 391,797	3,988,046	Mar. 9, 1976	Oct. 26, 1976
B 391,844	3,999,165	Mar. 16, 1976	Dec. 21, 1976
B 392,798	3,996,249	Mar. 30, 1976	Dec. 7, 1976
B 394,248	3,989,764	Jan. 27, 1976	Nov. 2, 1976
B 394,350	3,982,200	Jan. 13, 1976	Sep. 21, 1976
B 394,742	4,009,285	Apr. 13, 1976	Feb. 22, 1977
B 395,554	3,998,156	Mar. 9, 1976	Dec. 21, 1976
B 395,975	4,001,085	Mar. 2, 1976	Jan. 4, 1977
B 396,164	3,989,590	Feb. 3, 1976	Nov. 2, 1976
B 396,377	D 243,148	Apr. 6, 1976	Jan. 25, 1977
B 397,674	3,998,438	Mar. 16, 1976	Dec. 21, 1976
B 398,084	3,996,239	Feb. 3, 1976	Dec. 7, 1976
B 398,220	3,990,834	Feb. 3, 1976	Nov. 9, 1976
B 398,488	3,987,991	Feb. 24, 1976	Oct. 26, 1976
B 399,098	3,997,665	Feb. 24, 1976	Dec. 14, 1976
B 399,632	4,001,046	Mar. 9, 1976	Jan. 4, 1977
B 399,908	3,983,323	Jan. 13, 1976	Sep. 28, 1976
B 400,871	3,988,893	Feb. 17, 1976	Nov. 2, 1976
B 401,042	D 242,197	Mar. 16, 1976	Nov. 9, 1976
B 402,162	3,994,902	Mar. 2, 1976	Nov. 30, 1976
B 402,328	3,995,545	Apr. 6, 1976	Dec. 7, 1976
B 402,553	3,983,219	Feb. 17, 1976	Sep. 28, 1976
B 402,929	3,991,251	Feb. 3, 1976	Nov. 9, 1976
B 403,243	3,996,232	Mar. 30, 1976	Dec. 7, 1976
B 403,326	4,001,212	Mar. 23, 1976	Jan. 4, 1977
B 403,477	3,995,315	Feb. 3, 1976	Nov. 30, 1976
B 403,507	3,982,095	Feb. 10, 1976	Sep. 21, 1976
B 403,766	3,994,834	Feb. 10, 1976	Nov. 30, 1976
B 403,883	4,001,481	Mar. 23, 1976	Jan. 4, 1977
B 405,726	3,981,241	Jan. 13, 1976	Sep. 21, 1976
B 406,546	D 242,966	Mar. 16, 1976	Jan. 11, 1977
B 407,205	4,000,966	Mar. 16, 1976	Jan. 4, 1977
B 407,737	3,992,546	Feb. 3, 1976	Nov. 16, 1976
B 407,812	4,010,006	Mar. 23, 1976	Mar. 1, 1977
B 409,848	3,983,270	Jan. 27, 1976	Sep. 28, 1976
B 410,074	4,001,303	Feb. 24, 1976	Jan. 4, 1977
B 410,694	3,995,530	Mar. 23, 1976	Dec. 7, 1976
B 411,471	3,982,933	Feb. 17, 1976	Sep. 28, 1976
B 411,624	4,001,205	Mar. 16, 1976	Jan. 4, 1977
B 411,765	3,993,428	Feb. 24, 1976	Nov. 23, 1976
B 412,068	3,981,244	Jan. 13, 1976	Sep. 21, 1976
B 412,124	4,007,000	Mar. 23, 1976	Feb. 8, 1977
B 413,379	4,001,325	Mar. 9, 1976	Jan. 4, 1977
B 414,028	3,993,738	Feb. 17, 1976	Nov. 23, 1976
B 414,266	3,993,614	Feb. 10, 1976	Nov. 23, 1976
B 414,481	3,982,979	Jan. 20, 1976	Sep. 28, 1976
B 414,971	D 242,208	Feb. 10, 1976	Nov. 9, 1976
B 415,021	3,994,173	Mar. 2, 1976	Nov. 30, 1976
B 415,122	3,997,503	Feb. 10, 1976	Dec. 14, 1976
B 415,590	4,009,317	Mar. 23, 1976	Feb. 22, 1977
B 416,257	4,001,335	Mar. 16, 1976	Jan. 4, 1977
B 416,589	3,990,363	Jan. 27, 1976	Nov. 9, 1976
B 417,014	3,981,851	Jan. 13, 1976	Sep. 21, 1976
B 417,164	4,001,360	Mar. 2, 1976	Jan. 4, 1977
B 417,349	3,985,076	Mar. 9, 1976	Oct. 12, 1976
B 418,489	3,989,592	Jan. 13, 1976	Nov. 2, 1976
B 419,173	3,999,728	Mar. 9, 1976	Dec. 28, 1976
B 419,582	3,989,681	Mar. 2, 1976	Nov. 2, 1976
B 420,176	4,001,017	Mar. 16, 1976	Jan. 4, 1977
B 420,321	3,990,645	Mar. 30, 1976	Nov. 9, 1976
B 420,472	3,993,934	Feb. 24, 1976	Nov. 23, 1976
B 421,373	4,001,326	Mar. 23, 1976	Jan. 4, 1977
B 421,975	3,994,693	Mar. 2, 1976	Nov. 30, 1976
B 422,063	3,994,835	Feb. 3, 1976	Nov. 30, 1976
B 422,156	4,010,401	Mar. 23, 1976	Mar. 1, 1977
B 423,365	3,996,186	Feb. 17, 1976	Dec. 7, 1976
B 423,404	3,990,958	Mar. 2, 1976	Nov. 9, 1976
B 423,441	3,997,137	Feb. 17, 1976	Dec. 14, 1976
B 423,867	3,990,844	Feb. 3, 1976	Nov. 9, 1976
B 423,883	3,986,871	Jan. 27, 1976	Oct. 19, 1976
B 424,354	D 242,416	Feb. 10, 1976	Nov. 23, 1976
B 424,989	3,990,569	Feb. 3, 1976	Nov. 9, 1976
B 425,193	4,002,107	Mar. 23, 1976	Jan. 11, 1977

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 425,462	3,998,396	Mar. 9, 1976	Dec. 21, 1976
B 425,588	3,985,111	Jan. 13, 1976	Oct. 12, 1976
B 426,227	3,999,028	Mar. 2, 1976	Dec. 21, 1976
B 426,266	3,998,839	Mar. 2, 1976	Dec. 21, 1976
B 426,424	3,993,742	Feb. 3, 1976	Nov. 23, 1976
B 426,639	3,992,539	Feb. 3, 1976	Nov. 16, 1976
B 426,819	3,995,868	Feb. 17, 1976	Dec. 7, 1976
B 427,883	3,982,277	Jan. 20, 1976	Sep. 21, 1976
B 427,946	4,006,161	Mar. 23, 1976	Feb. 1, 1977
B 428,103	4,000,211	Feb. 10, 1976	Dec. 28, 1976
B 428,271	3,987,415	Mar. 23, 1976	Oct. 19, 1976
B 428,408	3,995,252	Mar. 2, 1976	Nov. 30, 1976
B 428,877	3,984,649	Jan. 27, 1976	Oct. 5, 1976
B 429,018	3,990,061	Feb. 10, 1976	Nov. 2, 1976
B 429,027	4,001,260	Mar. 23, 1976	Jan. 4, 1977
B 429,157	3,990,628	Jan. 27, 1976	Nov. 9, 1976
B 429,434	3,989,223	Feb. 17, 1976	Nov. 2, 1976
B 430,157	3,992,465	Feb. 17, 1976	Nov. 16, 1976
B 430,172	3,982,563	Jan. 13, 1976	Sep. 28, 1976
B 430,276	3,982,171	Jan. 20, 1976	Sep. 21, 1976
B 430,287	D 242,489	Feb. 10, 1976	Nov. 23, 1976
B 430,326	4,003,581	Mar. 23, 1976	Jan. 18, 1977
B 430,334	3,981,677	Jan. 27, 1976	Sep. 21, 1976
B 431,072	3,985,610	Jan. 20, 1976	Oct. 12, 1976
B 431,334	3,988,095	Mar. 16, 1976	Oct. 26, 1976
B 431,713	4,000,167	Feb. 10, 1976	Dec. 28, 1976
B 431,785	3,999,950	Feb. 24, 1976	Dec. 28, 1976
B 431,797	4,007,290	Mar. 30, 1976	Feb. 8, 1977
B 432,049	3,995,123	Mar. 23, 1976	Nov. 30, 1976
B 432,140	3,999,163	Mar. 23, 1976	Dec. 21, 1976
B 432,594	4,003,404	Mar. 30, 1976	Jan. 18, 1977
B 432,969	3,997,017	Mar. 2, 1976	Dec. 14, 1976
B 432,991	3,991,669	Mar. 2, 1976	Nov. 16, 1976
B 433,094	3,987,768	Jan. 27, 1976	Oct. 26, 1976
B 434,206	3,994,610	Feb. 3, 1976	Nov. 30, 1976
B 434,441	D 242,849	Mar. 16, 1976	Dec. 28, 1976
B 435,481	4,000,892	Mar. 9, 1976	Jan. 4, 1977
B 435,570	4,000,908	Mar. 16, 1976	Jan. 4, 1977
B 435,617	4,001,234	Mar. 16, 1976	Jan. 4, 1977
B 436,724	3,991,856	Feb. 24, 1976	Nov. 16, 1976
B 437,209	4,001,193	Feb. 3, 1976	Jan. 4, 1977
B 437,559	3,993,287	Feb. 3, 1976	Nov. 23, 1976
B 437,596	3,985,638	Jan. 27, 1976	Oct. 12, 1976
B 437,894	4,001,015	Mar. 2, 1976	Jan. 4, 1977
B 438,048	4,001,394	Mar. 23, 1976	Jan. 4, 1977
B 438,484	3,992,451	Feb. 17, 1976	Nov. 16, 1976
B 438,882	3,983,719	Feb. 24, 1976	Oct. 5, 1976
B 438,916	3,983,050	Jan. 13, 1976	Sep. 28, 1976
B 439,542	3,982,199	Jan. 27, 1976	Sep. 21, 1976
B 439,778	4,001,455	Feb. 3, 1976	Jan. 4, 1977
B 440,548	4,001,271	Mar. 16, 1976	Jan. 4, 1977
B 440,633	4,000,116	Feb. 10, 1976	Dec. 28, 1976
B 440,858	3,993,670	Feb. 3, 1976	Nov. 23, 1976
B 441,723	3,988,249	Mar. 16, 1976	Oct. 26, 1976
B 441,789	4,001,449	Mar. 30, 1976	Jan. 4, 1977
B 442,163	D 242,192	Mar. 16, 1976	Nov. 9, 1976
B 442,295	4,000,477	Mar. 16, 1976	Dec. 28, 1976
B 442,810	3,997,533	Feb. 24, 1976	Dec. 14, 1976
B 442,866	3,982,351	Feb. 24, 1976	Sep. 28, 1976
B 442,953	4,002,657	Mar. 23, 1976	Jan. 11, 1977
B 442,970	3,989,890	Feb. 3, 1976	Nov. 2, 1976
B 443,163	3,981,242	Feb. 3, 1976	Sep. 21, 1976
B 443,446	D 242,494	Apr. 6, 1976	Nov. 23, 1976
B 443,563	3,996,204	Feb. 24, 1976	Dec. 7, 1976
B 443,647	3,990,737	Feb. 17, 1976	Nov. 9, 1976
B 443,712	3,982,233	Jan. 27, 1976	Sep. 21, 1976
B 444,437	3,995,171	Mar. 9, 1976	Nov. 30, 1976
B 445,166	4,001,252	Mar. 2, 1976	Jan. 4, 1977
B 445,459	3,988,889	Feb. 3, 1976	Nov. 2, 1976
B 445,493	3,994,903	Mar. 2, 1976	Nov. 30, 1976
B 445,690	3,999,584	Feb. 3, 1976	Dec. 28, 1976
B 446,107	4,001,276	Mar. 9, 1976	Jan. 4, 1977
B 447,000	3,984,419	Feb. 3, 1976	Oct. 5, 1976
B 447,440	3,991,724	Feb. 17, 1976	Nov. 16, 1976
B 449,892	3,997,919	Mar. 23, 1976	Dec. 14, 1976
B 450,196	3,997,701	Feb. 10, 1976	Dec. 14, 1976
B 450,413	4,007,463	Mar. 23, 1976	Feb. 8, 1977
B 450,521	3,982,838	Feb. 17, 1976	Sep. 28, 1976
B 450,701	3,991,084	Mar. 16, 1976	Nov. 9, 1976
B 450,708	3,989,724	Mar. 9, 1976	Nov. 2, 1976
B 450,870	3,998,951	Mar. 16, 1976	Dec. 21, 1976
B 450,967	3,983,055	Jan. 13, 1976	Sep. 28, 1976
B 451,248	3,997,758	Mar. 2, 1976	Dec. 14, 1976
B 451,308	3,991,037	Feb. 17, 1976	Nov. 9, 1976
B 451,396	4,000,450	Apr. 13, 1976	Dec. 28, 1976
B 451,438	Re. 29,066	Mar. 2, 1976	Dec. 7, 1976
B 451,534	3,986,033	Jan. 13, 1976	Oct. 12, 1976
B 452,034	4,002,367	Mar. 23, 1976	Jan. 11, 1977
B 452,138	4,004,278	Mar. 23, 1976	Jan. 18, 1977
B 452,501	4,001,111	Mar. 16, 1976	Jan. 4, 1977
B 452,672	3,981,602	Jan. 13, 1976	Sep. 21, 1976
B 452,879	4,001,089	Mar. 16, 1976	Jan. 4, 1977
B 452,883	3,981,735	Jan. 27, 1976	Sep. 21, 1976
B 452,938	3,994,719	Feb. 17, 1976	Nov. 30, 1976
B 452,944	4,009,773	Mar. 30, 1976	Mar. 1, 1977
B 453,031	3,998,678	Mar. 16, 1976	Dec. 21, 1976
B 453,067	4,005,394	Mar. 23, 1976	Jan. 25, 1977
B 453,238	3,997,063	Mar. 2, 1976	Dec. 14, 1976
B 453,432	4,000,514	Mar. 16, 1976	Dec. 28, 1976
B 453,533	3,997,744	Feb. 17, 1976	Dec. 14, 1976
B 453,616	3,987,376	Jan. 27, 1976	Oct. 19, 1976
B 453,759	3,989,790	Jan. 27, 1976	Nov. 2, 1976
B 454,283	3,995,153	Feb. 3, 1976	Nov. 30, 1976
B 454,833	4,008,733	Mar. 30, 1976	Feb. 22, 1977
B 455,425	3,990,060	Feb. 3, 1976	Nov. 2, 1976
B 455,481	3,991,092	Feb. 24, 1976	Nov. 9, 1976
B 455,486	4,001,353	Mar. 16, 1976	Jan. 4, 1977
B 455,686	4,001,156	Mar. 2, 1976	Jan. 4, 1977
B 455,759	3,984,242	Feb. 24, 1976	Oct. 5, 1976
B 455,806	3,998,919	Mar. 23, 1976	Dec. 21, 1976
B 456,069	3,998,991	Mar. 9, 1976	Dec. 21, 1976
B 456,148	3,984,269	Jan. 13, 1976	Oct. 5, 1976
B 456,153	3,997,992	Mar. 9, 1976	Dec. 21, 1976
B 456,579	3,993,715	Feb. 10, 1976	Nov. 23, 1976
B 456,869	4,001,277	Mar. 9, 1976	Jan. 4, 1977
B 456,900	3,996,262	Feb. 3, 1976	Dec. 7, 1976
B 457,547	3,996,397	Feb. 17, 1976	Dec. 7, 1976
B 457,850	3,993,586	Feb. 10, 1976	Nov. 23, 1976
B 457,862	3,987,195	Jan. 27, 1976	Oct. 19, 1976
B 457,886	3,988,498	Jan. 13, 1976	Oct. 26, 1976
B 457,931	4,001,229	Mar. 16, 1976	Jan. 4, 1977
B 458,500	3,997,805	Feb. 24, 1976	Dec. 14, 1976
B 458,617	3,984,422	Feb. 3, 1976	Oct. 5, 1976
B 458,964	3,996,615	Mar. 2, 1976	Dec. 7, 1976
B 459,381	4,000,017	Mar. 9, 1976	Dec. 28, 1976
B 459,597	3,996,711	Feb. 17, 1976	Dec. 14, 1976
B 459,811	3,982,173	Jan. 20, 1976	Sep. 21, 1976
B 459,821	4,005,954	Mar. 30, 1976	Feb. 1, 1977
B 460,388	3,989,448	Jan. 27, 1976	Nov. 2, 1976
B 460,441	3,981,828	Jan. 13, 1976	Sep. 21, 1976
B 460,846	3,985,817	Feb. 24, 1976	Oct. 12, 1976
B 461,184	3,992,482	Feb. 17, 1976	Nov. 16, 1976
B 461,250	4,000,768	Mar. 16, 1976	Jan. 4, 1977
B 461,336	3,982,231	Feb. 3, 1976	Sep. 21, 1976
B 461,352	3,981,681	Jan. 13, 1976	Sep. 21, 1976
B 461,874	3,982,276	Jan. 27, 1976	Sep. 21, 1976
B 462,030	4,009,342	Mar. 23, 1976	Feb. 22, 1977
B 462,386	3,988,188	Jan. 13, 1976	Oct. 26, 1976
B 462,424	3,989,602	Feb. 24, 1976	Nov. 2, 1976
B 462,828	3,998,395	Mar. 9, 1976	Dec. 21, 1976
B 462,893	3,984,253	Feb. 24, 1976	Oct. 5, 1976
B 463,322	3,989,982	Jan. 20, 1976	Nov. 2, 1976
B 463,388	3,992,605	Feb. 10, 1976	Nov. 16, 1976
B 463,473	4,002,068	Mar. 23, 1976	Jan. 11, 1977
B 463,671	3,985,385	Jan. 13, 1976	Oct. 12, 1976
B 464,027	3,999,390	Mar. 16, 1976	Dec. 28, 1976
B 464,290	3,990,307	Feb. 3, 1976	Nov. 9, 1976
B 464,587	3,991,091	Feb. 3, 1976	Nov. 9, 1976
B 464,593	3,997,659	Mar. 9, 1976	Dec. 14, 1976
B 465,145	3,981,148	Jan. 27, 1976	Sep. 21, 1976
B 465,202	3,989,757	Feb. 24, 1976	Nov. 2, 1976
B 465,393	3,987,390	Jan. 27, 1976	Oct. 19, 1976
B 465,688	3,989,770	Jan. 27, 1976	Nov. 2, 1976
B 465,955	3,997,502	Feb. 3, 1976	Dec. 14, 1976
B 466,304	4,007,095	Mar. 23, 1976	Feb. 8, 1977
B 466,318	3,999,115	Mar. 9, 1976	Dec. 21, 1976
B 466,390	3,983,349	Feb. 24, 1976	Sep. 28, 1976
B 466,444	3,986,039	Jan. 20, 1976	Oct. 12, 1976
B 466,906	3,993,037	Mar. 16, 1976	Nov. 23, 1976
B 466,929	3,991,195	Jan. 27, 1976	Nov. 9, 1976
B 467,250	3,997,428	Feb. 3, 1976	Dec. 14, 1976
B 467,328	3,997,599	Mar. 9, 1976	Dec. 14, 1976
B 467,412	3,981,265	Jan. 13, 1976	Sep. 21, 1976
B 467,486	3,991,725	Mar. 16, 1976	Nov. 16, 1976
B 467,971	3,983,453	Jan. 13, 1976	Sep. 28, 1976
B 468,052	3,988,335	Feb. 10, 1976	Oct. 26, 1976
B 468,100	3,995,107	Mar. 9, 1976	Nov. 30, 1976
B 468,330	4,001,475	Mar. 16, 1976	Jan. 4, 1977
B 468,350	3,981,922	Jan. 13, 1976	Sep. 21, 1976
B 468,603	4,003,839	Mar. 23, 1976	Jan. 18, 1977
B 469,036	4,005,926	Mar. 16, 1976	Feb. 1, 1977
B 469,468	4,000,220	Mar. 16, 1976	Dec. 28, 1976
B 469,947	3,984,153	Jan. 20, 1976	Oct. 5, 1976
B 470,170	3,986,410	Jan. 13, 1976	Oct. 19, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 470,348	3,981,929	Jan. 13, 1976	Sep. 21, 1976
B 470,576	3,997,507	Feb. 24, 1976	Dec. 14, 1976
B 470,601	3,985,655	Mar. 9, 1976	Oct. 12, 1976
B 470,798	3,987,480	Jan. 20, 1976	Oct. 19, 1976
B 470,853	4,002,101	Mar. 23, 1976	Jan. 11, 1977
B 470,899	3,996,441	Mar. 2, 1976	Dec. 7, 1976
B 470,900	4,001,213	Mar. 2, 1976	Jan. 4, 1977
B 471,116	4,001,318	Feb. 17, 1976	Jan. 4, 1977
B 471,221	3,981,974	Jan. 13, 1976	Sep. 21, 1976
B 471,405	3,993,576	Feb. 10, 1976	Nov. 23, 1976
B 471,494	3,993,650	Mar. 16, 1976	Nov. 23, 1976
B 471,579	3,985,689	Jan. 13, 1976	Oct. 12, 1976
B 471,617	3,994,871	Feb. 10, 1976	Nov. 30, 1976
B 471,735	3,989,408	Feb. 3, 1976	Nov. 2, 1976
B 471,836	4,000,150	Feb. 24, 1976	Dec. 28, 1976
B 472,241	3,992,453	Feb. 17, 1976	Nov. 16, 1976
B 472,256	3,985,789	Jan. 13, 1976	Oct. 12, 1976
B 472,284	3,982,078	Jan. 13, 1976	Sep. 21, 1976
B 472,760	4,001,330	Apr. 13, 1976	Jan. 4, 1977
B 473,039	3,985,747	Feb. 10, 1976	Oct. 12, 1976
B 473,040	3,985,738	Feb. 10, 1976	Oct. 12, 1976
B 473,813	3,989,071	Mar. 9, 1976	Nov. 2, 1976
B 473,972	3,984,043	Jan. 13, 1976	Oct. 5, 1976
B 474,573	3,988,375	Jan. 20, 1976	Oct. 26, 1976
B 474,747	3,997,714	Feb. 24, 1976	Dec. 14, 1976
B 475,236	3,989,990	Feb. 3, 1976	Nov. 2, 1976
B 475,385	4,001,071	Mar. 9, 1976	Jan. 4, 1977
B 475,681	3,983,332	Jan. 20, 1976	Sep. 28, 1976
B 476,267	4,005,068	Apr. 6, 1976	Jan. 25, 1977
B 476,372	3,985,771	Feb. 24, 1976	Oct. 12, 1976
B 476,568	3,999,456	Mar. 16, 1976	Dec. 28, 1976
B 476,577	3,982,070	Jan. 20, 1976	Sep. 21, 1976
B 476,681	3,986,181	Jan. 13, 1976	Oct. 12, 1976
B 476,776	3,998,715	Mar. 23, 1976	Dec. 21, 1976
B 476,967	3,995,206	Mar. 9, 1976	Nov. 30, 1976
B 477,252	3,985,759	Jan. 13, 1976	Oct. 12, 1976
B 477,481	3,991,076	Feb. 3, 1976	Nov. 9, 1976
B 477,584	D 242,855	Apr. 6, 1976	Dec. 28, 1976
B 477,597	3,993,912	Feb. 17, 1976	Nov. 23, 1976
B 477,892	4,010,355	Mar. 30, 1976	Mar. 1, 1977
B 478,234	4,010,421	Mar. 30, 1976	Mar. 1, 1977
B 478,739	3,992,253	Feb. 17, 1976	Nov. 16, 1976
B 479,175	3,985,700	Feb. 17, 1976	Oct. 12, 1976
B 479,242	3,983,074	Feb. 17, 1976	Sep. 28, 1976
B 479,502	3,999,030	Mar. 16, 1976	Dec. 21, 1976
B 479,681	D 242,672	Mar. 16, 1976	Dec. 14, 1976
B 479,969	4,001,132	Mar. 9, 1976	Jan. 4, 1977
B 480,114	4,001,327	Mar. 2, 1976	Jan. 4, 1977
B 480,251	4,008,700	Mar. 23, 1976	Feb. 22, 1977
B 480,287	4,006,029	Mar. 30, 1976	Feb. 1, 1977
B 480,292	3,994,011	Mar. 16, 1976	Nov. 23, 1976
B 480,350	3,994,164	Feb. 10, 1976	Nov. 30, 1976
B 480,384	3,999,737	Mar. 23, 1976	Dec. 28, 1976
B 480,452	3,994,923	Feb. 10, 1976	Nov. 30, 1976
B 480,473	3,995,608	Mar. 2, 1976	Dec. 7, 1976
B 480,604	3,985,251	Jan. 13, 1976	Oct. 12, 1976
B 480,625	3,996,227	Feb. 24, 1976	Dec. 7, 1976
B 480,662	3,988,382	Mar. 2, 1976	Oct. 26, 1976
B 480,740	3,996,431	Mar. 2, 1976	Dec. 7, 1976
B 480,749	3,999,207	Mar. 9, 1976	Dec. 21, 1976
B 480,987	4,001,459	Mar. 30, 1976	Jan. 4, 1977
B 481,048	3,998,542	Mar. 16, 1976	Dec. 21, 1976
B 481,600	3,981,235	Jan. 27, 1976	Sep. 21, 1976
B 481,737	3,982,057	Jan. 13, 1976	Sep. 21, 1976
B 481,778	4,001,385	Mar. 30, 1976	Jan. 4, 1977
B 481,930	3,992,717	Feb. 24, 1976	Nov. 16, 1976
B 481,989	4,008,337	Mar. 23, 1976	Feb. 15, 1977
B 482,058	4,001,398	Mar. 2, 1976	Jan. 4, 1977
B 482,660	3,995,026	Feb. 10, 1976	Nov. 30, 1976
B 482,709	3,985,733	Feb. 24, 1976	Oct. 12, 1976
B 482,907	3,984,811	Jan. 20, 1976	Oct. 5, 1976
B 483,247	4,001,889	Apr. 13, 1976	Jan. 4, 1977
B 483,256	3,981,723	Feb. 10, 1976	Sep. 21, 1976
B 483,268	3,995,215	Mar. 9, 1976	Nov. 30, 1976
B 483,606	3,986,990	Jan. 27, 1976	Oct. 19, 1976
B 483,615	3,988,637	Jan. 27, 1976	Oct. 26, 1976
B 483,762	3,993,608	Feb. 10, 1976	Nov. 23, 1976
B 483,865	3,985,693	Jan. 13, 1976	Oct. 12, 1976
B 484,029	3,983,558	Feb. 10, 1976	Sep. 28, 1976
B 484,067	3,992,374	Feb. 17, 1976	Nov. 16, 1976
B 484,068	3,994,937	Mar. 2, 1976	Nov. 30, 1976
B 484,121	3,997,770	Mar. 16, 1976	Dec. 14, 1976
B 484,269	4,000,159	Feb. 10, 1976	Dec. 28, 1976
B 484,332	3,986,540	Mar. 2, 1976	Oct. 19, 1976
B 484,365	3,983,578	Jan. 27, 1976	Sep. 28, 1976
B 484,419	4,001,292	Mar. 9, 1976	Jan. 4, 1977
B 484,482	3,994,017	Mar. 23, 1976	Nov. 23, 1976
B 484,769	3,999,498	Mar. 16, 1976	Dec. 28, 1976
B 485,051	3,992,418	Feb. 17, 1976	Nov. 16, 1976
B 485,060	3,983,067	Feb. 17, 1976	Sep. 28, 1976
B 485,169	3,989,791	Mar. 16, 1976	Nov. 2, 1976
B 485,188	4,001,170	Mar. 16, 1976	Jan. 4, 1977
B 485,401	3,985,859	Jan. 27, 1976	Oct. 12, 1976
B 485,575	3,996,565	Feb. 24, 1976	Dec. 7, 1976
B 485,926	4,006,357	Mar. 23, 1976	Feb. 1, 1977
B 486,280	3,983,130	Feb. 3, 1976	Sep. 28, 1976
B 486,614	3,995,835	Feb. 17, 1976	Dec. 7, 1976
B 486,678	4,001,273	Mar. 2, 1976	Jan. 4, 1977
B 486,828	3,989,651	Mar. 2, 1976	Nov. 2, 1976
B 487,062	D 241,256	Feb. 10, 1976	Nov. 9, 1976
B 487,133	3,989,826	Jan. 27, 1976	Nov. 2, 1976
B 487,260	3,990,610	Jan. 27, 1976	Nov. 9, 1976
B 487,411	3,983,579	Feb. 24, 1976	Sep. 28, 1976
B 487,423	3,998,810	Mar. 2, 1976	Dec. 21, 1976
B 487,427	3,995,788	Mar. 2, 1976	Dec. 7, 1976
B 488,111	3,985,765	Jan. 13, 1976	Oct. 12, 1976
B 488,395	3,982,245	Jan. 27, 1976	Sep. 21, 1976
B 488,634	3,982,158	Jan. 20, 1976	Sep. 21, 1976
B 488,756	3,991,810	Mar. 16, 1976	Nov. 16, 1976
B 489,290	3,998,081	Feb. 17, 1976	Dec. 21, 1976
B 489,328	3,990,088	Jan. 20, 1976	Nov. 2, 1976
B 489,331	3,996,175	Feb. 17, 1976	Dec. 7, 1976
B 489,485	D 243,266	Apr. 13, 1976	Feb. 1, 1977
B 489,550	4,000,710	Mar. 16, 1976	Jan. 4, 1977
B 489,685	3,984,085	Feb. 24, 1976	Oct. 5, 1976
B 490,067	3,986,600	Jan. 27, 1976	Oct. 19, 1976
B 490,547	3,999,439	Feb. 24, 1976	Dec. 28, 1976
B 490,551	D 243,168	Apr. 6, 1976	Jan. 25, 1977
B 490,589	3,990,680	Feb. 3, 1976	Nov. 9, 1976
B 490,623	3,996,964	Mar. 2, 1976	Dec. 14, 1976
B 490,647	3,985,196	Feb. 24, 1976	Oct. 12, 1976
B 490,806	3,989,486	Feb. 3, 1976	Nov. 2, 1976
B 490,812	3,998,842	Mar. 30, 1976	Dec. 21, 1976
B 490,946	3,993,652	Feb. 17, 1976	Nov. 23, 1976
B 490,995	3,995,031	Feb. 3, 1976	Nov. 30, 1976
B 491,032	3,981,892	Feb. 10, 1976	Sep. 21, 1976
B 491,052	3,985,790	Mar. 2, 1976	Oct. 12, 1976
B 491,111	3,997,916	Feb. 17, 1976	Dec. 14, 1976
B 491,455	3,991,167	Feb. 3, 1976	Nov. 9, 1976
B 491,501	3,984,914	Jan. 13, 1976	Oct. 12, 1976
B 491,618	4,007,950	Mar. 16, 1976	Feb. 15, 1977
B 491,650	3,999,044	Mar. 9, 1976	Dec. 21, 1976
B 491,673	3,994,770	Feb. 17, 1976	Nov. 30, 1976
B 491,776	3,986,298	Mar. 16, 1976	Oct. 19, 1976
B 491,883	3,984,412	Feb. 3, 1976	Oct. 5, 1976
B 491,906	D 242,223	Feb. 10, 1976	Nov. 9, 1976
B 492,039	3,997,541	Feb. 24, 1976	Dec. 14, 1976
B 492,093	4,003,658	Mar. 23, 1976	Jan. 18, 1977
B 492,120	3,995,692	Feb. 24, 1976	Dec. 7, 1976
B 492,301	3,981,073	Jan. 13, 1976	Sep. 21, 1976
B 492,688	3,983,415	Jan. 20, 1976	Sep. 28, 1976
B 492,716	3,998,739	Mar. 2, 1976	Dec. 21, 1976
B 492,774	4,001,843	Mar. 9, 1976	Jan. 4, 1977
B 492,902	3,993,859	Feb. 24, 1976	Nov. 23, 1976
B 492,946	3,991,303	Jan. 27, 1976	Nov. 9, 1976
B 493,254	D 243,267	Apr. 13, 1976	Feb. 1, 1977
B 493,370	3,984,792	Mar. 16, 1976	Oct. 5, 1976
B 493,501	3,988,061	Feb. 3, 1976	Oct. 26, 1976
B 493,686	4,008,338	Mar. 23, 1976	Feb. 15, 1977
B 493,955	3,989,830	Mar. 9, 1976	Nov. 2, 1976
B 493,981	3,990,165	Mar. 9, 1976	Nov. 9, 1976
B 494,234	3,983,808	Feb. 10, 1976	Oct. 5, 1976
B 494,339	4,001,255	Mar. 16, 1976	Jan. 4, 1977
B 494,383	3,991,289	Feb. 3, 1976	Nov. 9, 1976
B 494,669	3,991,104	Feb. 3, 1976	Nov. 9, 1976
B 494,691	3,987,457	Mar. 16, 1976	Oct. 19, 1976
B 494,806	3,989,210	Feb. 3, 1976	Nov. 2, 1976
B 494,944	3,992,469	Feb. 17, 1976	Nov. 16, 1976
B 495,185	3,999,166	Mar. 9, 1976	Dec. 21, 1976
B 495,331	4,000,456	Mar. 16, 1976	Dec. 28, 1976
B 495,402	3,983,988	Feb. 17, 1976	Oct. 5, 1976
B 495,408	4,000,222	Feb. 3, 1976	Dec. 28, 1976
B 495,489	3,984,571	Feb. 3, 1976	Oct. 5, 1976
B 495,550	3,993,666	Feb. 3, 1976	Nov. 23, 1976
B 495,554	3,993,665	Feb. 3, 1976	Nov. 23, 1976
B 495,759	3,989,998	Feb. 3, 1976	Nov. 2, 1976
B 495,903	3,995,997	Feb. 17, 1976	Dec. 7, 1976
B 496,430	3,991,140	Feb. 10, 1976	Nov. 9, 1976
B 496,431	3,985,894	Jan. 13, 1976	Oct. 12, 1976
B 496,487	3,982,261	Jan. 20, 1976	Sep. 21, 1976
B 496,500	3,985,962	Feb. 3, 1976	Oct. 12, 1976
B 496,502	3,987,444	Jan. 20, 1976	Oct. 19, 1976
B 496,792	3,999,959	Feb. 17, 1976	Dec. 28, 1976
B 496,964	3,999,219	Apr. 20, 1976	Dec. 21, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 496,999	3,983,804	Jan. 27, 1976	Oct. 5, 1976	B 506,839	4,005,389	Mar. 23, 1976	Jan. 25, 1977
B 497,021	3,985,039	Jan. 13, 1976	Oct. 12, 1976	B 506,840	4,002,928	Mar. 23, 1976	Jan. 11, 1977
B 497,194	3,988,267	Feb. 3, 1976	Oct. 26, 1976	B 506,916	3,986,140	Feb. 3, 1976	Oct. 12, 1976
B 497,292	3,994,052	Feb. 3, 1976	Nov. 30, 1976	B 506,926	3,993,232	Feb. 17, 1976	Nov. 23, 1976
B 497,473	3,990,839	Feb. 3, 1976	Nov. 9, 1976	B 507,087	3,991,389	Feb. 17, 1976	Nov. 9, 1976
B 497,571	4,009,997	Mar. 23, 1976	Mar. 1, 1977	B 507,131	4,000,499	Mar. 2, 1976	Dec. 28, 1976
B 497,584	3,988,184	Feb. 24, 1976	Oct. 26, 1976	B 507,396	3,995,167	Feb. 10, 1976	Nov. 30, 1976
B 497,702	3,996,589	Mar. 2, 1976	Dec. 7, 1976	B 507,476	3,994,680	Feb. 10, 1976	Nov. 30, 1976
B 497,780	3,997,500	Feb. 24, 1976	Dec. 14, 1976	B 507,647	3,982,240	Jan. 27, 1976	Sep. 21, 1976
B 497,853	3,987,934	Feb. 17, 1976	Oct. 26, 1976	B 508,118	3,992,283	Feb. 17, 1976	Nov. 16, 1976
B 497,896	D 243,091	Apr. 6, 1976	Jan. 18, 1977	B 508,119	3,992,285	Feb. 17, 1976	Nov. 16, 1976
B 497,960	3,991,325	Jan. 20, 1976	Nov. 9, 1976	B 508,369	3,985,847	Jan. 13, 1976	Oct. 12, 1976
B 498,208	4,001,480	Apr. 13, 1976	Jan. 4, 1977	B 508,639	4,004,194	Mar. 23, 1976	Jan. 18, 1977
B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976	B 508,817	3,989,891	Feb. 3, 1976	Nov. 2, 1976
B 498,205	3,989,611	Feb. 10, 1976	Nov. 2, 1976	B 508,878	3,994,117	Feb. 3, 1976	Nov. 30, 1976
B 498,500	3,982,241	Jan. 20, 1976	Sep. 21, 1976	B 508,940	3,981,321	Feb. 17, 1976	Sep. 21, 1976
B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976	B 508,961	3,987,477	Feb. 3, 1976	Oct. 19, 1976
B 498,820	3,996,670	Mar. 9, 1976	Dec. 14, 1976	B 509,043	3,996,767	Feb. 24, 1976	Dec. 14, 1976
B 498,951	3,996,907	Mar. 2, 1976	Dec. 14, 1976	B 509,165	3,999,155	Mar. 2, 1976	Dec. 21, 1976
B 499,171	3,985,192	Jan. 27, 1976	Oct. 12, 1976	B 509,185	3,989,996	Feb. 3, 1976	Nov. 2, 1976
B 499,209	3,995,907	Feb. 24, 1976	Dec. 7, 1976	B 509,238	3,982,399	Feb. 24, 1976	Sep. 28, 1976
B 499,227	3,981,344	Jan. 27, 1976	Sep. 21, 1976	B 509,474	3,997,260	Feb. 17, 1976	Dec. 14, 1976
B 499,324	4,001,375	Mar. 16, 1976	Jan. 4, 1977	B 509,586	4,006,645	Feb. 3, 1976	Feb. 8, 1977
B 499,352	3,981,391	Jan. 27, 1976	Sep. 21, 1976	B 509,606	3,989,986	Feb. 3, 1976	Nov. 2, 1976
B 499,718	3,990,058	Jan. 27, 1976	Nov. 2, 1976	B 509,772	3,999,004	Mar. 16, 1976	Dec. 21, 1976
B 499,786	4,000,663	Mar. 16, 1976	Jan. 4, 1977	B 510,184	D 242,784	Apr. 6, 1976	Dec. 21, 1976
B 500,171	3,997,262	Mar. 30, 1976	Dec. 14, 1976	B 510,278	4,008,972	Mar. 30, 1976	Feb. 22, 1977
B 500,176	3,995,316	Feb. 3, 1976	Nov. 30, 1976	B 510,281	3,993,215	Mar. 9, 1976	Nov. 23, 1976
B 500,408	D 242,721	Mar. 16, 1976	Dec. 14, 1976	B 510,346	D 242,207	Feb. 10, 1976	Nov. 9, 1976
B 500,945	3,996,817	Feb. 24, 1976	Dec. 14, 1976	B 510,458	4,000,221	Feb. 10, 1976	Dec. 28, 1976
B 500,981	3,984,681	Jan. 27, 1976	Oct. 5, 1976	B 510,521	3,990,656	Mar. 2, 1976	Nov. 9, 1976
B 501,122	3,981,385	Feb. 17, 1976	Sep. 21, 1976	B 510,588	3,981,539	Jan. 27, 1976	Sep. 21, 1976
B 501,181	3,984,761	Feb. 10, 1976	Oct. 5, 1976	B 510,677	3,989,541	Feb. 24, 1976	Nov. 2, 1976
B 501,253	3,994,015	Feb. 3, 1976	Nov. 23, 1976	B 510,682	4,000,978	Mar. 30, 1976	Jan. 4, 1977
B 501,317	3,985,643	Jan. 13, 1976	Oct. 12, 1976	B 510,850	3,989,841	Feb. 3, 1976	Nov. 2, 1976
B 501,415	3,982,051	Jan. 13, 1976	Sep. 21, 1976	B 510,855	3,981,059	Jan. 27, 1976	Sep. 21, 1976
B 501,503	4,001,640	Mar. 2, 1976	Jan. 4, 1977	B 511,907	3,999,622	Mar. 30, 1976	Dec. 28, 1976
B 501,540	3,985,694	Jan. 13, 1976	Oct. 12, 1976	B 510,998	3,992,336	Feb. 10, 1976	Nov. 16, 1976
B 501,975	3,998,466	Mar. 2, 1976	Dec. 21, 1976	B 511,002	3,998,717	Mar. 2, 1976	Dec. 21, 1976
B 501,993	3,981,606	Jan. 13, 1976	Sep. 21, 1976	B 511,099	3,990,162	Feb. 3, 1976	Nov. 9, 1976
B 502,151	3,998,614	Mar. 23, 1976	Dec. 21, 1976	B 511,156	3,981,364	Jan. 27, 1976	Sep. 21, 1976
B 502,161	4,000,500	Mar. 2, 1976	Dec. 28, 1976	B 511,346	3,984,072	Jan. 27, 1976	Oct. 5, 1976
B 502,289	3,982,274	Jan. 13, 1976	Sep. 21, 1976	B 511,407	3,981,485	Feb. 10, 1976	Sep. 21, 1976
B 502,381	D 242,231	Mar. 16, 1976	Nov. 9, 1976	B 511,454	3,982,333	Feb. 24, 1976	Sep. 28, 1976
B 502,540	3,983,698	Jan. 13, 1976	Oct. 5, 1976	B 511,665	4,001,037	Mar. 2, 1976	Jan. 4, 1977
B 502,571	D 242,433	Apr. 6, 1976	Nov. 23, 1976	B 511,885	3,981,346	Jan. 27, 1976	Sep. 21, 1976
B 502,589	3,989,652	Jan. 27, 1976	Nov. 2, 1976	B 511,886	3,989,991	Feb. 3, 1976	Nov. 2, 1976
B 502,652	3,989,186	Feb. 24, 1976	Nov. 2, 1976	B 511,909	3,981,183	Feb. 17, 1976	Sep. 21, 1976
B 502,667	3,991,431	Feb. 24, 1976	Nov. 16, 1976	B 512,324	3,985,084	Feb. 17, 1976	Oct. 12, 1976
B 502,973	3,982,161	Jan. 27, 1976	Sep. 21, 1976	B 512,547	3,984,193	Jan. 13, 1976	Oct. 5, 1976
B 502,993	3,992,489	Feb. 17, 1976	Nov. 16, 1976	B 512,745	3,981,294	Jan. 13, 1976	Sep. 21, 1976
B 503,029	3,986,879	Jan. 27, 1976	Oct. 19, 1976	B 512,818	3,997,363	Apr. 6, 1976	Dec. 14, 1976
B 503,345	4,001,235	Feb. 24, 1976	Jan. 4, 1977	B 512,849	3,982,141	Feb. 3, 1976	Sep. 21, 1976
B 503,371	4,009,401	Mar. 30, 1976	Feb. 22, 1977	B 512,964	3,995,279	Feb. 10, 1976	Nov. 30, 1976
B 503,436	3,988,819	Feb. 24, 1976	Nov. 2, 1976	B 513,014	3,991,113	Feb. 10, 1976	Nov. 9, 1976
B 503,456	4,007,702	Mar. 23, 1976	Feb. 15, 1977	B 513,027	3,995,143	Feb. 17, 1976	Nov. 30, 1976
B 503,521	3,999,646	Mar. 16, 1976	Dec. 28, 1976	B 513,134	4,006,764	Mar. 23, 1976	Feb. 8, 1977
B 503,579	3,989,680	Feb. 10, 1976	Nov. 2, 1976	B 513,280	3,988,211	Jan. 20, 1976	Oct. 26, 1976
B 503,618	3,997,782	Mar. 9, 1976	Dec. 14, 1976	B 513,368	3,982,138	Feb. 3, 1976	Sep. 21, 1976
B 503,742	3,989,756	Feb. 17, 1976	Nov. 2, 1976	B 513,706	3,986,064	Jan. 13, 1976	Oct. 12, 1976
B 503,780	3,990,055	Mar. 16, 1976	Nov. 2, 1976	B 513,756	3,993,869	Feb. 3, 1976	Nov. 23, 1976
B 503,817	3,988,307	Jan. 13, 1976	Oct. 26, 1976	B 513,781	4,001,324	Feb. 24, 1976	Jan. 4, 1977
B 504,056	3,993,923	Feb. 24, 1976	Nov. 23, 1976	B 513,789	3,981,599	Feb. 3, 1976	Sep. 21, 1976
B 504,061	3,987,534	Mar. 16, 1976	Oct. 26, 1976	B 513,791	4,008,608	Mar. 30, 1976	Feb. 22, 1977
B 504,156	3,999,048	Mar. 23, 1976	Dec. 21, 1976	B 514,687	3,986,522	Jan. 27, 1976	Oct. 19, 1976
B 504,169	3,981,219	Jan. 13, 1976	Sep. 21, 1976	B 515,135	3,990,085	Feb. 17, 1976	Nov. 2, 1976
B 504,404	3,996,499	Feb. 24, 1976	Dec. 7, 1976	B 515,303	3,987,939	Jan. 20, 1976	Oct. 26, 1976
B 504,405	4,007,401	Apr. 13, 1976	Feb. 8, 1977	B 515,452	3,995,243	Feb. 10, 1976	Nov. 30, 1976
B 504,439	3,999,398	Mar. 16, 1976	Dec. 28, 1976	B 515,455	3,982,149	Jan. 27, 1976	Sep. 21, 1976
B 504,503	3,999,210	Mar. 9, 1976	Dec. 21, 1976	B 515,642	4,001,258	Feb. 24, 1976	Jan. 4, 1977
B 504,582	4,005,138	Mar. 30, 1976	Jan. 25, 1977	B 515,908	3,984,676	Jan. 20, 1976	Oct. 5, 1976
B 504,778	3,986,650	Feb. 24, 1976	Oct. 19, 1976	B 516,002	3,988,638	Jan. 13, 1976	Oct. 26, 1976
B 504,877	3,997,564	Feb. 24, 1976	Dec. 14, 1976	B 516,032	3,986,634	Jan. 27, 1976	Oct. 19, 1976
B 504,899	3,991,273	Mar. 9, 1976	Nov. 9, 1976	B 516,047	3,985,741	Feb. 10, 1976	Oct. 12, 1976
B 505,126	3,981,745	Feb. 10, 1976	Sep. 21, 1976	B 516,060	3,983,572	Feb. 17, 1976	Sep. 28, 1976
B 505,582	4,001,659	Mar. 23, 1976	Jan. 4, 1977	B 516,069	3,986,208	Mar. 16, 1976	Oct. 12, 1976
B 505,689	3,987,631	Mar. 2, 1976	Oct. 26, 1976	B 516,296	3,984,404	Feb. 3, 1976	Oct. 5, 1976
B 505,813	3,985,175	Jan. 13, 1976	Oct. 12, 1976	B 516,537	3,996,784	Feb. 17, 1976	Dec. 14, 1976
B 506,144	3,991,147	Feb. 10, 1976	Nov. 9, 1976	B 516,564	3,993,931	Feb. 17, 1976	Nov. 23, 1976
B 506,148	3,988,319	Feb. 3, 1976	Oct. 26, 1976	B 516,609	3,994,486	Feb. 24, 1976	Nov. 30, 1976
B 506,167	3,990,652	Feb. 10, 1976	Nov. 9, 1976	B 516,804	3,991,209	Mar. 23, 1976	Nov. 9, 1976
B 506,286	3,982,085	Jan. 20, 1976	Sep. 21, 1976	B 516,825	3,988,885	Feb. 3, 1976	Nov. 2, 1976
B 506,461	3,987,348	Jan. 20, 1976	Oct. 19, 1976	B 517,273	D 242,798	Mar. 16, 1976	Dec. 21, 1976
B 506,566	3,985,402	Jan. 20, 1976	Oct. 12, 1976	B 517,504	3,999,855	Mar. 9, 1976	Dec. 28, 1976
B 506,624	3,999,695	Mar. 9, 1976	Dec. 28, 1976	B 517,762	3,986,065	Mar. 16, 1976	Oct. 12, 1976
B 506,648	3,994,857	Feb. 3, 1976	Nov. 30, 1976	B 517,858	4,000,999	Feb. 17, 1976	Jan. 4, 1977
B 506,744	3,981,176	Jan. 13, 1976	Sep. 21, 1976	B 517,956	D 243,088	Apr. 6, 1976	Jan. 18, 1977

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 517,957	D 243,089	Apr. 6, 1976	Jan. 18, 1977
B 518,226	3,993,509	Feb. 10, 1976	Nov. 23, 1976
B 518,326	4,008,282	Mar. 23, 1976	Feb. 15, 1977
B 518,656	3,989,732	Feb. 17, 1976	Nov. 2, 1976
B 518,859	3,989,971	Feb. 3, 1976	Nov. 2, 1976
B 518,999	3,990,323	Feb. 3, 1976	Nov. 9, 1976
B 519,095	3,993,621	Feb. 24, 1976	Nov. 23, 1976
B 519,377	3,987,223	Jan. 27, 1976	Oct. 19, 1976
B 519,446	3,985,815	Feb. 24, 1976	Oct. 12, 1976
B 519,485	3,991,134	Feb. 10, 1976	Nov. 9, 1976
B 519,486	3,992,481	Feb. 17, 1976	Nov. 16, 1976
B 519,487	3,992,337	Feb. 17, 1976	Nov. 16, 1976
B 519,599	3,995,350	Feb. 17, 1976	Dec. 7, 1976
B 519,932	3,988,618	Feb. 3, 1976	Oct. 26, 1976
B 519,979	3,982,067	Feb. 3, 1976	Sep. 21, 1976
B 520,063	3,989,934	Mar. 2, 1976	Nov. 2, 1976
B 520,075	3,989,935	Feb. 24, 1976	Nov. 2, 1976
B 520,076	3,989,936	Mar. 2, 1976	Nov. 2, 1976
B 520,082	3,989,937	Mar. 23, 1976	Nov. 2, 1976
B 520,115	4,003,072	Mar. 23, 1976	Jan. 11, 1977
B 520,227	4,002,823	Mar. 30, 1976	Jan. 11, 1977
B 520,256	3,985,730	Jan. 13, 1976	Oct. 12, 1976
B 520,277	3,995,635	Feb. 17, 1976	Dec. 7, 1976
B 520,341	3,992,028	Mar. 16, 1976	Nov. 16, 1976
B 520,384	3,986,592	Jan. 27, 1976	Oct. 19, 1976
B 520,514	3,988,308	Mar. 9, 1976	Oct. 26, 1976
B 520,534	3,997,119	Feb. 17, 1976	Dec. 14, 1976
B 520,543	3,986,768	Jan. 27, 1976	Oct. 19, 1976
B 520,546	4,001,133	Mar. 2, 1976	Jan. 4, 1977
B 520,613	3,991,341	Mar. 16, 1976	Nov. 9, 1976
B 520,658	3,998,778	Mar. 9, 1976	Dec. 21, 1976
B 520,884	4,000,433	Mar. 16, 1976	Dec. 28, 1976
B 520,924	3,982,113	Jan. 27, 1976	Sep. 21, 1976
B 520,928	3,983,617	Jan. 13, 1976	Oct. 5, 1976
B 520,952	4,000,876	Mar. 16, 1976	Jan. 4, 1977
B 520,995	4,009,996	Mar. 23, 1976	Mar. 1, 1977
B 521,025	3,998,838	Mar. 23, 1976	Dec. 21, 1976
B 521,044	3,983,435	Feb. 24, 1976	Sep. 28, 1976
B 521,045	3,983,433	Feb. 24, 1976	Sep. 28, 1976
B 521,046	3,983,434	Feb. 24, 1976	Sep. 28, 1976
B 521,125	3,994,865	Feb. 10, 1976	Nov. 30, 1976
B 521,126	3,997,510	Feb. 10, 1976	Dec. 14, 1976
B 521,127	3,996,201	Feb. 17, 1976	Dec. 7, 1976
B 521,128	3,997,511	Feb. 10, 1976	Dec. 14, 1976
B 521,324	3,983,143	Jan. 27, 1976	Sep. 28, 1976
B 521,480	3,982,665	Jan. 13, 1976	Sep. 28, 1976
B 521,600	3,981,458	Jan. 27, 1976	Sep. 21, 1976
B 521,612	4,000,251	Mar. 9, 1976	Dec. 28, 1976
B 521,620	3,983,749	Jan. 27, 1976	Oct. 5, 1976
B 521,643	3,997,567	Mar. 2, 1976	Dec. 14, 1976
B 521,711	3,989,835	Feb. 10, 1976	Nov. 2, 1976
B 521,793	3,996,981	Feb. 24, 1976	Dec. 14, 1976
B 521,984	3,983,220	Feb. 17, 1976	Sep. 28, 1976
B 521,986	3,981,607	Feb. 3, 1976	Sep. 21, 1976
B 522,009	3,995,444	Feb. 17, 1976	Dec. 7, 1976
B 522,038	3,993,119	Feb. 3, 1976	Nov. 23, 1976
B 522,227	3,992,904	Mar. 30, 1976	Nov. 23, 1976
B 522,309	3,991,603	Feb. 3, 1976	Nov. 16, 1976
B 522,354	3,984,959	Jan. 20, 1976	Oct. 12, 1976
B 522,446	4,001,194	Mar. 30, 1976	Jan. 4, 1977
B 522,537	3,999,587	Mar. 30, 1976	Dec. 28, 1976
B 522,567	3,996,238	Feb. 17, 1976	Dec. 7, 1976
B 522,568	D 242,785	Apr. 6, 1976	Dec. 21, 1976
B 522,577	3,982,123	Jan. 27, 1976	Sep. 21, 1976
B 522,629	4,001,155	Mar. 16, 1976	Jan. 4, 1977
B 523,226	4,006,367	Mar. 23, 1976	Feb. 1, 1977
B 523,696	3,986,071	Jan. 13, 1976	Oct. 12, 1976
B 523,885	3,981,040	Feb. 17, 1976	Sep. 21, 1976
B 523,952	3,988,707	Mar. 23, 1976	Oct. 26, 1976
B 524,026	3,992,206	Feb. 10, 1976	Nov. 16, 1976
B 524,121	3,982,536	Feb. 3, 1976	Sep. 28, 1976
B 524,179	3,985,872	Jan. 13, 1976	Oct. 12, 1976
B 524,464	3,985,580	Feb. 10, 1976	Oct. 12, 1976
B 524,806	4,000,065	Mar. 2, 1976	Dec. 28, 1976
B 525,133	3,996,481	Mar. 23, 1976	Dec. 7, 1976
B 525,204	4,001,109	Mar. 16, 1976	Jan. 4, 1977
B 525,809	3,985,040	Feb. 24, 1976	Oct. 12, 1976
B 325,961	3,985,557	Jan. 13, 1976	Oct. 12, 1976
B 526,106	3,990,073	Jan. 27, 1976	Nov. 2, 1976
B 526,190	3,982,129	Feb. 17, 1976	Sep. 21, 1976
B 526,289	3,992,641	Feb. 24, 1976	Nov. 16, 1976
B 526,388	3,992,017	Feb. 3, 1976	Nov. 16, 1976
B 526,445	3,984,978	Jan. 20, 1976	Oct. 12, 1976
B 526,447	4,000,052	Feb. 24, 1976	Dec. 28, 1976
B 526,510	3,989,708	Jan. 20, 1976	Nov. 2, 1976
B 526,997	3,985,695	Jan. 13, 1976	Oct. 12, 1976
B 527,054	3,981,559	Feb. 17, 1976	Sep. 21, 1976
B 527,171	3,998,248	Mar. 9, 1976	Dec. 21, 1976
B 527,187	3,995,202	Feb. 17, 1976	Nov. 30, 1976
B 527,333	3,999,732	Mar. 23, 1976	Dec. 28, 1976
B 527,669	3,982,206	Jan. 13, 1976	Sep. 21, 1976
B 527,693	3,995,233	Feb. 3, 1976	Nov. 30, 1976
B 527,788	D 242,337	Feb. 10, 1976	Nov. 16, 1976
B 527,972	4,000,016	Mar. 9, 1976	Dec. 28, 1976
B 527,999	3,981,682	Feb. 3, 1976	Sep. 21, 1976
B 528,297	4,001,138	Mar. 16, 1976	Jan. 4, 1977
B 528,303	3,991,023	Feb. 10, 1976	Nov. 9, 1976
B 528,401	3,991,619	Feb. 3, 1976	Nov. 16, 1976
B 528,756	3,990,476	Feb. 3, 1976	Nov. 9, 1976
B 528,761	3,982,221	Feb. 10, 1976	Sep. 21, 1976
B 528,962	3,989,666	Feb. 24, 1976	Nov. 2, 1976
B 528,966	3,989,667	Feb. 24, 1976	Nov. 2, 1976
B 529,156	3,989,158	Jan. 13, 1976	Nov. 2, 1976
B 529,194	4,000,776	Mar. 23, 1976	Jan. 4, 1977
B 529,659	3,996,875	Feb. 24, 1976	Dec. 14, 1976
B 529,836	3,994,345	Feb. 3, 1976	Nov. 30, 1976
B 529,974	3,987,098	Feb. 17, 1976	Oct. 19, 1976
B 530,174	3,993,635	Feb. 24, 1976	Nov. 23, 1976
B 530,255	3,996,103	Mar. 2, 1976	Dec. 7, 1976
B 530,263	4,009,736	Mar. 30, 1976	Mar. 1, 1977
B 530,303	4,006,029	Mar. 23, 1976	Feb. 1, 1977
B 530,318	3,985,752	Jan. 13, 1976	Oct. 12, 1976
B 530,569	3,999,865	Mar. 16, 1976	Dec. 28, 1976
B 530,580	4,001,151	Mar. 2, 1976	Jan. 4, 1977
B 530,605	3,989,064	Feb. 3, 1976	Nov. 2, 1976
B 530,813	3,986,131	Feb. 17, 1976	Oct. 12, 1976
B 530,873	4,001,016	Feb. 17, 1976	Jan. 4, 1977
B 530,925	3,983,161	Feb. 24, 1976	Sep. 28, 1976
B 531,096	3,984,415	Feb. 10, 1976	Oct. 5, 1976
B 531,267	3,997,040	Feb. 24, 1976	Dec. 14, 1976
B 531,425	3,992,595	Feb. 3, 1976	Nov. 16, 1976
B 531,566	3,997,820	Mar. 16, 1976	Dec. 14, 1976
B 531,686	3,990,017	Mar. 23, 1976	Nov. 2, 1976
B 531,753	3,988,843	Mar. 2, 1976	Nov. 2, 1976
B 531,929	3,986,067	Jan. 20, 1976	Oct. 12, 1976
B 532,005	3,992,397	Feb. 24, 1976	Nov. 16, 1976
B 532,140	4,001,299	Mar. 2, 1976	Jan. 4, 1977
B 532,319	3,990,292	Feb. 3, 1976	Nov. 9, 1976
B 532,326	3,993,959	Mar. 23, 1976	Nov. 23, 1976
B 532,424	D 242,292	Feb. 10, 1976	Nov. 9, 1976
B 532,476	3,992,756	Feb. 3, 1976	Nov. 23, 1976
B 532,901	3,984,318	Jan. 13, 1976	Oct. 5, 1976
B 532,969	3,981,706	Jan. 13, 1976	Sep. 21, 1976
B 532,976	4,000,837	Mar. 23, 1976	Jan. 4, 1977
B 533,056	3,983,969	Jan. 13, 1976	Oct. 5, 1976
B 533,259	3,999,556	Feb. 24, 1976	Dec. 28, 1976
B 533,454	3,996,566	Mar. 2, 1976	Dec. 7, 1976
B 533,580	3,982,255	Feb. 3, 1976	Sep. 21, 1976
B 533,652	4,000,196	Mar. 23, 1976	Dec. 28, 1976
B 533,734	3,984,799	Jan. 27, 1976	Oct. 5, 1976
B 533,968	3,986,576	Jan. 27, 1976	Oct. 19, 1976
B 534,016	3,983,381	Feb. 3, 1976	Sep. 28, 1976
B 534,313	3,981,675	Jan. 27, 1976	Sep. 21, 1976
B 534,314	3,981,786	Feb. 10, 1976	Sep. 21, 1976
B 534,333	3,981,480	Feb. 17, 1976	Sep. 21, 1976
B 534,334	D 242,722	Mar. 16, 1976	Dec. 14, 1976
B 534,443	3,989,970	Jan. 27, 1976	Nov. 2, 1976
B 534,574	3,995,624	Feb. 24, 1976	Dec. 7, 1976
B 534,591	3,991,141	Feb. 17, 1976	Nov. 9, 1976
B 534,767	3,982,180	Feb. 3, 1976	Sep. 21, 1976
B 534,991	3,983,517	Jan. 27, 1976	Sep. 28, 1976
B 535,076	3,981,718	Jan. 20, 1976	Sep. 21, 1976
B 535,209	4,001,873	Mar. 16, 1976	Jan. 4, 1977
B 535,256	3,999,150	Mar. 23, 1976	Dec. 21, 1976
B 535,268	3,999,045	Mar. 30, 1976	Dec. 21, 1976
B 535,386	3,981,150	Jan. 13, 1976	Sep. 21, 1976
B 535,391	3,981,386	Jan. 27, 1976	Sep. 21, 1976
B 535,411	3,990,543	Feb. 24, 1976	Nov. 9, 1976
B 535,437	3,997,555	Feb. 24, 1976	Dec. 14, 1976
B 535,448	3,997,123	Mar. 16, 1976	Dec. 14, 1976
B 535,466	3,981,309	Jan. 27, 1976	Sep. 21, 1976
B 535,813	3,981,819	Jan. 27, 1976	Sep. 21, 1976
B 535,928	3,981,466	Jan. 13, 1976	Sep. 21, 1976
B 536,009	3,982,112	Jan. 27, 1976	Sep. 21, 1976
B 536,082	3,997,783	Mar. 16, 1976	Dec. 14, 1976
B 536,322	4,001,272	Mar. 23, 1976	Jan. 4, 1977
B 536,403	3,998,341	Mar. 23, 1976	Dec. 21, 1976
B 536,511	3,995,989	Mar. 9, 1976	Dec. 7, 1976
B 536,675	3,985,773	Jan. 20, 1976	Oct. 12, 1976
B 536,923	4,007,828	Mar. 30, 1976	Feb. 15, 1977
B 536,935	3,985,729	Jan. 13, 1976	Oct. 12, 1976
B 537,058	4,000,969	Mar. 23, 1976	Jan. 4, 1977
B 537,102	3,981,829	Jan. 13, 1976	Sep. 21, 1976
B 537,709	3,981,368	Jan. 13, 1976	Sep. 21, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 537,711	3,985,748	Jan. 13, 1976	Oct. 12, 1976
B 537,722	3,985,423	Feb. 3, 1976	Oct. 12, 1976
B 537,903	3,986,492	Jan. 20, 1976	Oct. 19, 1976
B 538,472	3,992,884	Feb. 3, 1976	Nov. 23, 1976
B 538,491	3,982,928	Feb. 17, 1976	Sep. 28, 1976
B 538,686	3,982,199	Jan. 13, 1976	Sep. 21, 1976
B 538,753	3,993,642	Feb. 10, 1976	Nov. 23, 1976
B 539,374	3,996,229	Mar. 9, 1976	Dec. 7, 1976
B 539,746	3,983,423	Feb. 17, 1976	Sep. 28, 1976
B 540,078	3,984,701	Jan. 13, 1976	Oct. 5, 1976
B 540,218	3,986,108	Feb. 10, 1976	Oct. 12, 1976
B 540,632	3,981,600	Jan. 13, 1976	Sep. 21, 1976
B 540,767	3,986,010	Mar. 16, 1976	Oct. 12, 1976
B 540,872	3,982,135	Jan. 20, 1976	Sep. 21, 1976
B 540,888	4,005,528	Mar. 30, 1976	Feb. 1, 1977
B 541,015	3,993,208	Jan. 27, 1976	Nov. 23, 1976
B 541,376	3,981,690	Feb. 17, 1976	Sep. 21, 1976
B 541,415	3,982,080	Feb. 3, 1976	Sep. 21, 1976
B 541,464	3,995,424	Feb. 17, 1976	Dec. 7, 1976
B 541,496	3,982,232	Jan. 27, 1976	Sep. 21, 1976
B 541,501	4,005,826	Apr. 13, 1976	Feb. 1, 1977
B 541,517	3,986,156	Jan. 13, 1976	Oct. 12, 1976
B 541,710	3,994,472	Feb. 24, 1976	Nov. 30, 1976
B 542,135	3,986,939	Feb. 10, 1976	Oct. 19, 1976
B 542,158	3,981,886	Jan. 13, 1976	Sep. 21, 1976
B 542,226	3,993,748	Feb. 24, 1976	Nov. 23, 1976
B 543,078	3,995,687	Feb. 17, 1976	Dec. 7, 1976
B 543,941	3,985,528	Jan. 13, 1976	Oct. 12, 1976
B 544,034	3,997,175	Feb. 17, 1976	Dec. 14, 1976
B 544,476	3,993,585	Feb. 24, 1976	Nov. 23, 1976
B 544,899	3,994,962	Feb. 17, 1976	Nov. 30, 1976
B 544,961	3,983,492	Jan. 13, 1976	Sep. 28, 1976
B 545,050	3,982,073	Jan. 20, 1976	Sep. 21, 1976
B 545,265	D 243,090	Apr. 13, 1976	Jan. 18, 1977
B 545,299	4,001,259	Feb. 24, 1976	Jan. 4, 1977
B 545,464	3,992,387	Feb. 10, 1976	Nov. 16, 1976
B 545,630	3,981,337	Jan. 27, 1976	Sep. 21, 1976
B 545,777	4,004,906	Jan. 27, 1976	Jan. 25, 1977
B 545,856	4,006,939	Mar. 30, 1976	Feb. 8, 1977
B 545,935	3,990,337	Jan. 27, 1976	Nov. 9, 1976
B 545,945	3,995,260	Jan. 27, 1976	Nov. 30, 1976
B 546,097	3,999,309	Mar. 23, 1976	Dec. 28, 1976
B 546,295	3,987,070	Jan. 20, 1976	Oct. 19, 1976
B 546,426	3,982,063	Jan. 27, 1976	Sep. 21, 1976
B 546,631	3,983,729	Feb. 3, 1976	Oct. 5, 1976
B 546,665	3,990,062	Jan. 20, 1976	Nov. 2, 1976
B 546,911	3,981,058	Jan. 13, 1976	Sep. 21, 1976
B 546,922	3,987,742	Mar. 16, 1976	Oct. 26, 1976
B 547,016	3,999,741	Mar. 23, 1976	Dec. 28, 1976
B 547,208	4,001,218	Feb. 24, 1976	Jan. 4, 1977
B 547,547	3,997,670	Feb. 24, 1976	Dec. 14, 1976
B 547,994	3,990,081	Jan. 20, 1976	Nov. 2, 1976
B 548,028	3,991,517	Feb. 3, 1976	Nov. 16, 1976
B 548,058	3,983,050	Feb. 17, 1976	Sep. 28, 1976
B 548,155	3,981,477	Jan. 13, 1976	Sep. 21, 1976
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976
B 548,302	3,983,414	Feb. 17, 1976	Sep. 28, 1976
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976
B 548,462	D 242,283	Feb. 10, 1976	Nov. 9, 1976
B 548,688	3,995,984	Mar. 9, 1976	Dec. 7, 1976
B 548,719	3,990,553	Feb. 17, 1976	Nov. 9, 1976
B 548,978	3,998,139	Mar. 9, 1976	Dec. 21, 1976
B 549,198	3,981,975	Jan. 13, 1976	Sep. 21, 1976
B 549,244	3,981,125	Jan. 27, 1976	Sep. 21, 1976
B 549,394	3,981,611	Jan. 27, 1976	Sep. 21, 1976
B 549,931	3,986,141	Jan. 20, 1976	Oct. 12, 1976
B 549,964	3,995,899	Feb. 24, 1976	Dec. 7, 1976
B 550,693	3,982,194	Jan. 20, 1976	Sep. 21, 1976
B 550,744	3,993,550	Feb. 17, 1976	Nov. 23, 1976
B 550,810	4,000,910	Mar. 23, 1976	Jan. 4, 1977
B 551,133	3,996,740	Mar. 2, 1976	Dec. 14, 1976
B 551,463	3,996,254	Feb. 17, 1976	Dec. 7, 1976
B 551,527	3,982,599	Jan. 13, 1976	Sep. 28, 1976
B 551,809	3,996,743	Feb. 24, 1976	Dec. 14, 1976
B 551,952	Re. 29,059	Mar. 2, 1976	Dec. 7, 1976
B 552,006	3,992,129	Feb. 3, 1976	Nov. 16, 1976
B 552,489	3,994,864	Feb. 10, 1976	Nov. 30, 1976
B 552,498	3,983,139	Jan. 13, 1976	Sep. 28, 1976
B 552,508	4,001,250	Mar. 16, 1976	Jan. 4, 1977
B 552,629	3,994,773	Mar. 23, 1976	Nov. 30, 1976
B 552,709	4,001,467	Mar. 23, 1976	Jan. 4, 1977
B 552,932	3,989,292	Feb. 3, 1976	Nov. 2, 1976
B 553,421	4,001,146	Mar. 23, 1976	Jan. 4, 1977
B 553,460	3,990,019	Feb. 3, 1976	Nov. 2, 1976
B 553,584	3,992,456	Feb. 17, 1976	Nov. 16, 1976
B 553,629	3,999,242	Feb. 24, 1976	Dec. 28, 1976
B 554,039	3,999,944	Feb. 24, 1976	Dec. 28, 1976
B 554,164	4,001,465	Mar. 9, 1976	Jan. 4, 1977
B 554,283	3,981,152	Jan. 27, 1976	Sep. 21, 1976
B 554,291	4,001,209	Mar. 9, 1976	Jan. 4, 1977
B 554,380	4,001,147	Mar. 9, 1976	Jan. 4, 1977
B 554,594	3,985,960	Jan. 20, 1976	Oct. 12, 1976
B 554,848	4,001,265	Feb. 24, 1976	Jan. 4, 1977
B 554,939	3,994,013	Feb. 10, 1976	Nov. 23, 1976
B 555,146	4,007,636	Apr. 20, 1976	Feb. 15, 1977
B 555,437	3,991,152	Feb. 3, 1976	Nov. 9, 1976
B 555,456	3,993,423	Mar. 30, 1976	Nov. 23, 1976
B 555,772	3,982,641	Jan. 13, 1976	Sep. 28, 1976
B 556,057	3,985,349	Jan. 13, 1976	Oct. 12, 1976
B 556,496	3,990,244	Mar. 16, 1976	Nov. 9, 1976
B 556,897	3,992,972	Feb. 3, 1976	Nov. 23, 1976
B 557,153	3,991,603	Feb. 3, 1976	Nov. 16, 1976
B 557,299	3,990,357	Feb. 3, 1976	Nov. 9, 1976
B 557,621	3,990,800	Feb. 3, 1976	Nov. 9, 1976
B 557,856	3,991,019	Feb. 10, 1976	Nov. 9, 1976
B 558,220	3,990,009	Jan. 27, 1976	Nov. 2, 1976
B 558,251	3,981,289	Jan. 13, 1976	Sep. 21, 1976
B 558,813	3,989,188	Feb. 3, 1976	Nov. 2, 1976
B 558,818	3,983,762	Jan. 13, 1976	Oct. 5, 1976
B 558,819	3,990,160	Feb. 3, 1976	Nov. 9, 1976
B 558,973	3,981,126	Feb. 10, 1976	Sep. 21, 1976
B 559,111	3,984,854	Feb. 24, 1976	Oct. 5, 1976
B 559,142	4,001,124	Mar. 2, 1976	Jan. 4, 1977
B 559,697	3,995,770	Mar. 16, 1976	Dec. 7, 1976
B 559,700	4,001,189	Mar. 23, 1976	Jan. 4, 1977
B 559,701	4,001,190	Mar. 23, 1976	Jan. 4, 1977
B 559,737	3,984,668	Jan. 20, 1976	Oct. 5, 1976
B 559,954	3,982,673	Feb. 3, 1976	Sep. 28, 1976
B 560,261	3,987,493	Mar. 16, 1976	Oct. 19, 1976
B 560,488	3,989,940	Mar. 16, 1976	Nov. 2, 1976
B 560,717	3,982,034	Feb. 10, 1976	Sep. 21, 1976
B 560,765	3,983,389	Feb. 3, 1976	Sep. 28, 1976
B 561,062	D 242,248	Feb. 10, 1976	Nov. 9, 1976
B 561,365	4,005,078	Apr. 13, 1976	Jan. 25, 1977
B 561,387	3,985,706	Feb. 10, 1976	Oct. 12, 1976
B 561,405	4,003,770	Mar. 30, 1976	Jan. 18, 1977
B 561,712	3,992,126	Feb. 17, 1976	Nov. 16, 1976
B 561,732	3,991,460	Feb. 3, 1976	Nov. 16, 1976
B 561,764	3,984,634	Jan. 27, 1976	Oct. 5, 1976
B 561,770	4,000,366	Mar. 16, 1976	Dec. 28, 1976
B 561,784	3,984,710	Jan. 27, 1976	Oct. 5, 1976
B 562,413	4,000,930	Mar. 16, 1976	Jan. 4, 1977
B 562,462	3,985,836	Jan. 13, 1976	Oct. 12, 1976
B 562,601	3,998,360	Mar. 16, 1976	Dec. 21, 1976
B 562,698	3,983,972	Jan. 13, 1976	Oct. 5, 1976
B 562,813	3,985,491	Feb. 3, 1976	Oct. 12, 1976
B 563,070	3,996,230	Mar. 9, 1976	Dec. 7, 1976
B 563,165	4,000,977	Mar. 9, 1976	Jan. 4, 1977
B 563,244	3,983,562	Jan. 27, 1976	Sep. 28, 1976
B 563,301	3,995,589	Feb. 17, 1976	Dec. 7, 1976
B 563,412	3,992,127	Feb. 24, 1976	Nov. 16, 1976
B 563,419	3,999,051	Mar. 23, 1976	Dec. 21, 1976
B 563,722	3,990,925	Jan. 13, 1976	Nov. 9, 1976
B 563,780	3,987,769	Feb. 3, 1976	Oct. 26, 1976
B 563,932	4,000,638	Mar. 23, 1976	Jan. 4, 1977
B 564,252	4,001,293	Mar. 2, 1976	Jan. 4, 1977
B 564,314	3,984,996	Jan. 20, 1976	Oct. 12, 1976
B 564,902	4,001,351	Mar. 23, 1976	Jan. 4, 1977
B 565,180	3,981,685	Jan. 27, 1976	Sep. 21, 1976
B 565,275	3,990,299	Apr. 6, 1976	Nov. 9, 1976
B 565,717	3,999,138	Apr. 13, 1976	Dec. 21, 1976
B 566,464	3,996,367	Feb. 3, 1976	Dec. 7, 1976
B 566,556	3,998,511	Mar. 23, 1976	Dec. 21, 1976
B 566,572	3,988,590	Mar. 16, 1976	Oct. 26, 1976
B 566,585	4,001,083	Mar. 2, 1976	Jan. 4, 1977
B 567,058	3,985,188	Jan. 13, 1976	Oct. 12, 1976
B 567,158	3,988,073	Mar. 23, 1976	Oct. 26, 1976
B 567,207	3,991,689	Apr. 13, 1976	Nov. 16, 1976
B 567,435	3,995,724	Feb. 3, 1976	Dec. 7, 1976
B 567,854	3,985,038	Feb. 3, 1976	Oct. 12, 1976
B 567,892	4,000,855	Mar. 16, 1976	Jan. 4, 1977
B 568,226	3,992,698	Feb. 24, 1976	Nov. 16, 1976
B 568,770	3,982,213	Feb. 10, 1976	Sep. 21, 1976
B 569,125	3,986,980	Feb. 24, 1976	Oct. 19, 1976
B 569,293	4,004,149	Mar. 30, 1976	Jan. 18, 1977
B 569,501	3,999,250	Mar. 9, 1976	Dec. 28, 1976
B 569,519	3,993,133	Feb. 3, 1976	Nov. 23, 1976
B 569,646	3,985,222	Jan. 13, 1976	Oct. 12, 1976
B 569,859	3,994,160	Mar. 9, 1976	Nov. 30, 1976
B 570,172	3,987,763	Feb. 3, 1976	Oct. 26, 1976
B 570,615	3,998,570	Mar. 23, 1976	Dec. 21, 1976
B 570,862	3,991,639	Feb. 24, 1976	Nov. 16, 1976
B 571,219	3,991,388	Feb. 24, 1976	Nov. 9, 1976
B 571,638	4,001,244	Mar. 9, 1976	Jan. 4, 1977

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 571,659	3,995,186	Apr. 13, 1976	Nov. 30, 1976
B 572,642	3,990,715	Feb. 10, 1976	Nov. 9, 1976
B 573,033	3,995,224	Mar. 23, 1976	Nov. 30, 1976
B 573,994	4,000,641	Mar. 23, 1976	Jan. 4, 1977
B 574,128	3,982,961	Feb. 17, 1976	Sep. 28, 1976
B 574,616	4,000,424	Mar. 2, 1976	Dec. 28, 1976
B 574,996	3,989,718	Feb. 17, 1976	Nov. 2, 1976
B 575,583	4,000,928	Mar. 16, 1976	Jan. 4, 1977
B 575,757	3,981,170	Jan. 27, 1976	Sep. 21, 1976
B 575,851	3,985,826	Feb. 10, 1976	Oct. 12, 1976
B 576,385	4,009,498	Mar. 30, 1976	Mar. 1, 1977
B 576,859	3,991,526	Feb. 24, 1976	Nov. 16, 1976
B 576,903	3,995,032	Feb. 3, 1976	Nov. 30, 1976
B 578,447	3,982,658	Jan. 20, 1976	Sep. 28, 1976
B 579,104	3,982,081	Jan. 27, 1976	Sep. 21, 1976
B 579,116	3,986,227	Feb. 3, 1976	Oct. 19, 1976
B 579,806	3,995,318	Feb. 3, 1976	Nov. 30, 1976
B 580,379	4,000,796	Apr. 6, 1976	Jan. 4, 1977
B 580,826	3,988,391	Feb. 17, 1976	Oct. 26, 1976
B 580,921	3,984,054	Jan. 13, 1976	Oct. 5, 1976
B 581,843	4,000,562	Mar. 16, 1976	Jan. 4, 1977
B 583,051	3,990,714	Feb. 3, 1976	Nov. 9, 1976
B 583,089	3,982,174	Jan. 27, 1976	Sep. 21, 1976
B 583,712	3,995,064	Feb. 10, 1976	Nov. 30, 1976
B 584,520	3,981,149	Jan. 27, 1976	Sep. 21, 1976
B 584,997	4,000,030	Mar. 9, 1976	Dec. 28, 1976
B 585,247	3,989,914	Feb. 3, 1976	Nov. 2, 1976
B 585,731	3,993,603	Feb. 3, 1976	Nov. 23, 1976
B 586,215	3,985,302	Jan. 20, 1976	Oct. 12, 1976
B 586,380	3,983,885	Mar. 2, 1976	Oct. 5, 1976
B 586,387	3,981,311	Feb. 3, 1976	Sep. 21, 1976
B 586,663	3,992,080	Feb. 3, 1976	Nov. 16, 1976
B 587,118	Re. 29,067	Mar. 2, 1976	Dec. 7, 1976
B 587,786	3,991,204	Feb. 17, 1976	Nov. 9, 1976
B 587,936	3,999,052	Mar. 23, 1976	Dec. 21, 1976
B 589,179	4,001,102	Mar. 23, 1976	Jan. 4, 1977
B 589,687	3,995,349	Mar. 23, 1976	Dec. 7, 1976
B 589,966	3,985,828	Feb. 17, 1976	Oct. 12, 1976
B 590,158	3,985,163	Feb. 10, 1976	Oct. 12, 1976
B 590,159	3,985,164	Feb. 3, 1976	Oct. 12, 1976
B 590,502	4,001,171	Mar. 23, 1976	Jan. 4, 1977
B 592,143	3,984,713	Jan. 27, 1976	Oct. 5, 1976
B 592,146	4,001,084	Mar. 2, 1976	Jan. 4, 1977
B 592,658	4,001,164	Mar. 23, 1976	Jan. 4, 1977
B 594,871	3,999,245	Mar. 16, 1976	Dec. 28, 1976
B 596,692	3,992,349	Feb. 17, 1976	Nov. 16, 1976
B 597,410	4,000,925	Mar. 30, 1976	Jan. 4, 1977
B 657,438	3,985,701	Jan. 20, 1976	Oct. 12, 1976
B 747,785	3,981,899	Feb. 10, 1976	Sep. 21, 1976
B 750,679	4,007,049	Mar. 23, 1976	Feb. 8, 1977
B 843,038	3,981,785	Feb. 3, 1976	Sep. 21, 1976
B 845,044	4,001,338	Mar. 30, 1976	Jan. 4, 1977
B 848,336	3,993,752	Mar. 30, 1976	Nov. 23, 1976

LIST OF DEFENSIVE PUBLICATIONS

APPLICANTS TO WHOM

DEFENSIVE PUBLICATIONS WERE ISSUED ON THE 1ST DAY OF MARCH, 1977

Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O. G. 687.

Ballard, Denis George Harold; Jones, Eric; and Padget, John Christopher, to Imperial Chemical Industries Limited. Ethylene polymers. T956,004, 3-1-77, Cl. 526-350.000.

Continental Oil Company: *See*—
Sias, Roy C., T956,002.

Imperial Chemical Industries Limited: *See*—
Ballard, Denis George Harold; Jones, Eric; and Padget, John Christopher, T956,004.

Jones, Eric: *See*—
Ballard, Denis George Harold; Jones, Eric; and Padget, John Christopher, T956,004.

Kasper, George P.; and O'Brien, Robert J. Electrographic apparatus and process for humidity stabilized development. T956,001, 3-1-77, Cl. 96-1.0SD.

National Semiconductor Corporation: *See*—
Simone, Richard B., T956,003.

O'Brien, Robert J.: *See*—
Kasper, George P.; and O'Brien, Robert J., T956,001.

Padget, John Christopher: *See*—
Ballard, Denis George Harold; Jones, Eric; and Padget, John Christopher, T956,004.

Sias, Roy C., to Continental Oil Company. Waterflooding method using sulfonates. T956,002, 3-1-77, Cl. 252-8.55D.

Simone, Richard B., to National Semiconductor Corporation. Interconnect logic for a serial processor. T956,003, 3-1-77, Cl. 340-172.500.

LIST OF REISSUE PATENTEES

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NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Bayer Aktiengesellschaft: *See*—
Dorn, Ludwig; Heinze, Gerhard; Wokulat, Jurgen; Moller, Wilhelm; Rubsam, Franz, deceased; Rubsam, Ralph Wilhelm, heir; Rubsam, Marion Mathilde Emilie, heir; and Rubsam, Bernd Friedrich Konrad, heir, Re. 29,145.

Bunger, David A., to D. H. Baldwin Company. Automatic chord and rhythm system for electronic organ. Re. 29,144, Cl. 84-1.010.

D. H. Baldwin Company: *See*—
Bunger, David A., Re. 29,144.

Dorn, Ludwig; Heinze, Gerhard; Wokulat, Jurgen; Moller, Wilhelm; Rubsam, Franz, deceased (by Rubsam, Marianne); by Rubsam, Ralph Wilhelm, heir; by Rubsam, Marion Mathilde Emilie, heir; and by Rubsam, Bernd Friedrich Konrad, heir, to Bayer Aktiengesellschaft. Catalyst for sulfuric acid contact process. Re. 29,145, Cl. 252-452.000.

Heinze, Gerhard: *See*—
Dorn, Ludwig; Heinze, Gerhard; Wokulat, Jurgen; Moller, Wilhelm; Rubsam, Franz, deceased; Rubsam, Ralph Wilhelm, heir; Rubsam, Marion Mathilde Emilie, heir; and Rubsam, Bernd Friedrich Konrad, heir, Re. 29,145.

Moller, Wilhelm: *See*—
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Rubsam, Marianne: *See*—
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Rubsam, Marion Mathilde Emilie, heir: *See*—
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Wokulat, Jurgen: *See*—
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Driscol Strawberry Associates, Inc.: *See*—
Johnson, Harold A., Jr., 4,020.

Jackson & Perkins Co.: *See*—
Warriner, William A., 4,019.

Johnson, Harold A., Jr., to Driscol Strawberry Associates, Inc. Strawberry plant. 4,020, 3-1-77, Cl. 49.000.

Warriner, William A., to Jackson & Perkins Co. Rose plant. 4,019, 3-1-77, Cl. 14.000.

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Benedict, Melvin A. Sandwich. 243,481, 3-1-77, Cl. D1-15.000.
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Bodine, Kenneth E.; and McDowell, Verle A. Portable air supply tank. 243,530, 3-1-77, Cl. D23-2.000.
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Buhk, Randall P., to Steelcase, Inc. Secretarial arm chair. 243,487, 3-1-77, Cl. D6-31.000.
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Cornell, Robert G., to Gillette Company, The. Table lighter base. 243,539, 3-1-77, Cl. D27-39.000.
Coulombe, Joseph L. Clip-on wheel reflector for bicycles. 243,514, 3-1-77, Cl. D10-111.000.
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Dillon, Richard R.; and Graham, John F., to Honeywell Information Systems, Inc. Multiple use service cart. 243,518, 3-1-77, Cl. D12-29.000.
Drew, Donald G. Slide fastener presser foot. 243,555, 3-1-77, Cl. D15-72.000.
Fadler, Norman L.; Jones, Paul W.; and Kirchner, Jack R., to McDonnell Douglas Corporation. Antimicrobial susceptibility card for use with an automated microbial identification machine. 243,542, 3-1-77, Cl. D24-29.000.
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Fireman, Simon C., to Aqua-Leisure Industries, Inc. Swim goggles. 243,482, 3-1-77, Cl. D2-234.000.
Flowers, Robert E. Ventilated cover for motorcycle seat. 243,496, 3-1-77, Cl. D6-191.000.
Fyffe, Billy D. Spray gun for washing vehicles. 243,532, 3-1-77, Cl. D23-17.000.
Galvin, Aaron A.; and Keeler, Francis R., to American District Telegraph Company. Intrusion alarm. 243,513, 3-1-77, Cl. D10-106.000.
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Hickman, Ronald Price. Drill guide. 243,505, 3-1-77, Cl. D8-14.000.
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Hoyle, James Irwin; and Balic, Andre Bob. Stand for hair dryer and curling iron. 243,559, 3-1-77, Cl. D28-38.000.
Ikeda, Matafumi, to Sharp Kabushiki Kaisha (Sharp Corporation). Electronic calculating machine. 243,535, 3-1-77, Cl. D64-11.00B.
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King, Mendel. Road marker. 243,515, 3-1-77, Cl. D10-113.000.
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Pietraszek, Thaddeus A.; Van Twisk, Richard J.; and Brazdzionis, Algis B., to Uniroyal Inc. Boot. 243,483, 3-1-77, Cl. D2-275.000.
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Van Kersen, Philip L. Card-mounted thermometer. 243,512, 3-1-77, Cl. D10-57.000.
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116	4,009,587
126	4,009,588
180	4,009,589
	4,009,590
	4,009,591
222	4,009,592
250	4,009,593
278	4,009,594
300	4,009,595
499	4,010,018
503	4,009,596

CLASS 65

36	4,010,019
142	4,010,020
229	4,010,021
277	4,010,022

CLASS 66

193	4,009,597

CLASS 68

12 R	4,009,598

CLASS 70

90	4,009,599
355	4,009,600

CLASS 72

209	4,009,610
369	4,009,601
459	4,009,602

CLASS 73

3	4,009,603
4 R	4,009,604
56	4,009,605
91	4,009,606
141 A	4,009,608
141 R	4,009,607
155	4,009,609
	4,009,613
195	4,009,614
362 AR	4,009,615
398 R	4,009,616
422 TC	4,009,617
424	4,009,618
425.6	4,009,611
480	4,009,612
517 R	4,009,619

CLASS 74

236	4,009,620
243 DR	4,009,621
492	4,009,622
512	4,009,623

CLASS 75

3	4,010,023
.5 AC	4,010,025
.5 BC	4,010,024
11	4,010,026
52	4,010,027
53	4,010,028
60	4,010,029
76	4,010,030

CLASS 81

15.7	4,009,624

CLASS 83

97	4,009,625
116	4,009,626
205	4,009,627
294	4,009,628
355	4,009,629
369	4,009,630
375	4,009,631
731	4,009,632

CLASS 84

1.01	Re.29,144
	4,009,633

CLASS 85

3 R	4,009,634

CLASS 89

1.5 G	4,009,635
34	4,009,638

CLASS 90

4	4,009,636
11 B	4,009,637

CLASS 91

25	4,009,639
47	4,009,640
375 A	4,009,641
464	4,009,642
492	4,009,643

CLASS 92

125	4,009,644
202	4,009,645

CLASS 93

36.01	4,009,646

CLASS 96

1 TE	4,010,031
31	4,010,032
48 R	4,010,033
60 BF	4,010,034
66.3	4,010,035
	4,010,036
100	4,010,037

CLASS 98

36	4,009,647
40 V	4,009,648
50	4,009,649

CLASS 99

490	4,009,650
579	4,009,651
590	4,009,652

CLASS 100

88	4,009,653

CLASS 101

93.09	4,009,654
93.31	4,009,655
129	4,009,656
157	4,009,657
348	4,009,658
415.1	4,009,659
450	4,009,660

CLASS 102

61	4,009,661
70.2 R	4,009,662

CLASS 104

1 R	4,009,663

CLASS 105

239	4,009,664

CLASS 106

22	4,010,038
57	4,010,039
281 R	4,010,040
287 R	4,010,041

CLASS 108

111	4,009,665

CLASS 110

8 A	4,009,667

CLASS 111

6	4,009,666
85	4,009,668

CLASS 112

79 R	4,009,669
231	4,009,670
258	4,009,671
262	4,009,672
264	4,009,673
265	4,009,674

CLASS 114

78	4,009,676
267	4,009,675

CLASS 115

18 E	4,009,677
18 R	4,009,678

CLASS 116

120	4,009,679

CLASS 118

49.1	4,009,680
70	4,009,681
118	4,009,682
266	4,009,683

CLASS 119

1	4,009,684
22	4,009,685
26	4,009,686
51 R	4,009,687

CLASS 123

8.09	4,009,688
8.13	4,009,689
8.45	4,009,690
8.47	4,009,691
32 SP	4,009,692
41.82 A	4,009,693
90.12	4,009,694
90.13	4,009,695
90.35	4,009,696
117 A	4,009,698
117 D	4,009,699
117 R	4,009,697
119 A	4,009,700
122 AC	4,009,701
193 P	4,009,702

CLASS 124

35 A	4,009,703

CLASS 126

221	4,009,704
307 A	4,009,705

CLASS 127

48	4,009,706

CLASS 128

2 Z	4,009,707
2.05 A	4,009,709
2.05 P	4,009,708
44	4,009,710
79	4,009,711
92 BA	4,009,712
193	4,009,713
214 R	4,009,714
	4,009,715
218 NV	4,009,716
294	4,009,717
330	4,009,718
335	4,009,719
351	4,009,720
419 PG	4,009,721

CLASS 131

39	4,009,722
84 R	4,009,723
187	4,009,724

CLASS 132

11 R	4,009,725

CLASS 134

2	4,010,042
46	4,009,726

CLASS 137

454.2	4,009,727
594	4,009,728
614.05	4,009,729
625.69	4,009,730

CLASS 138

37	4,009,731
97	4,009,732
103	4,009,733
125	4,009,734
147	4,009,735
177	4,009,736

CLASS 139

370.2	4,009,737

CLASS 140

149	4,009,738

CLASS 141

59	4,009,739
172	4,009,740

CLASS 144

41	4,009,741
230	4,009,742

CLASS 145

1 A	4,009,743

CLASS 148

11.5 A	4,010,046
20.3	4,010,047
24	4,010,048
37	4,010,049
113	4,010,050
174	4,010,045

CLASS 150

52 R	4,009,744

CLASS 156

71	4,010,051
120	4,010,052
154	4,010,053
173	4,010,054
226	4,010,055
296	4,010,056
384	4,010,057
415	4,010,058
420	4,010,059
425	4,010,060
504	4,010,061
506	4,010,062
510	4,010,063
578	4,010,203
617 SP	4,010,064

CLASS 159

4 CC	4,010,065

CLASS 160

297	4,009,745
323 R	4,009,746

CLASS 162

49	4,010,066
76	4,010,067

CLASS 164

7	4,009,747
73	4,009,748
147	4,009,749
154	4,009,750

CLASS 165

1	4,009,751
81	4,009,752

CLASS 166

55.1	4,009,753
77	4,009,754
250	4,009,756
270	4,009,755
276	4,009,757

CLASS 172

4.5	4,009,758
395	4,009,759

CLASS 174

48	4,010,314
107	4,010,315
140 R	4,010,316

CLASS 175

320	4,009,760

CLASS 176

37	4,010,068
68	4,010,069
86 R	4,010,070

CLASS 178

88	4,010,323

CLASS 179

1 P	4,010,324
15 BA	4,010,326
15 BS	4,010,325
41 A	4,010,327
81 R	4,010,328
84 T	4,010,329
90 B	4,010,330
99	4,010,331
	4,010,332
100.4 C	4,010,333
114 M	4,010,334
156 R	4,010,335

CLASS 180

6.2	4,009,761

CLASS 182

20	4,009,762
187	4,009,763

CLASS 184

15 A	4,009,764

CLASS 187

9 E	4,009,765
29 R	4,009,766
31	4,009,767

CLASS 188

24	4,009,768
77 R	4,009,769
82.74	4,009,770

CLASS 192

105 A	4,009,771

CLASS 195

7	4,010,071
30	4,010,072
64	4,010,073
66 B	4,010,074
80 R	4,010,075
115	4,010,076
127	4,010,077
139	4,010,078

CLASS 197

1 R	4,009,772

CLASS 198

344	4,009,773
403	4,009,775
478	4,009,776
773	4,009,774

CLASS 200

51 R	4,010,336
67 D	4,010,337
144 R	4,010,338
292	4,010,339
330	4,010,340

CLASS 201

4	4,010,079

CLASS 202

83	4,010,080
228	4,010,081

CLASS 203

8	4,010,082

CLASS 204

15	4,010,083
43 T	4,010,084
128	4,010,085
141.5	4,010,086
158 HA	4,010,087
159.24	4,010,088
168	4,010,089
170	4,010,090
290 F	4,010,091

CLASS 206

5.1	4,009,777
219	4,009,778
315 R	4,009,779
	4,009,780
387	4,009,781

CLASS 208

11 R	4,010,092
65	4,010,093
164	4,010,094

CLASS 209

73	4,009,782
108	4,009,783
132	4,010,095
139 R	4,010,096
	4,010,097

CLASS 210

10	4,010,098
21	4,010,099
71	4,010,391
86	4,010,101
151	4,010,102
242 R	4,010,103

CLASS 211

46	4,009,784

CLASS 214

1 BT	4,009,785
6 S	4,009,789
8.5 C	4,009,786
10.5 R	4,009,787
17 B	4,009,788
83.3	4,009,792
317	4,009,790
501	4,009,791

CLASS 215

210	4,009,794
246	4,009,793

CLASS 219

10.49	4,010,342
10.55 D	4,010,343
80	4,010,344
121 L	4,010,345
125 PL	4,010,346
146	4,010,347
347	4,010,348
400	4,010,341
401	4,010,349
465	4,010,350
523	4,010,351
553	4,010,352

CLASS 220

64	4,009,795
84	4,009,796
242	4,009,797
325	4,009,798

CLASS 221

3	4,009,799

CLASS 222

28	4,009,800
70	4,009,801
108	4,009,802
200	4,009,803
391	4,009,804
530	4,009,805
545	4,009,806

CLASS 223

96	4,009,807

CLASS 224

6	4,009,808
25 A	4,009,809
39	4,009,810

CLASS 225

7	4,009,811
97	4,009,812
103	4,009,813

CLASS 226

113	4,009,814
	4,009,815

CLASS 228

207	4,009,816

CLASS 229

2.5 R	4,009,817
23 R	4,009,818
32	4,009,819
33	4,009,820
36	4,009,821

CLASS 233

3	4,009,822
7	4,009,823
26	4,009,824

CLASS 235

54 F	4,010,353
61.11 E	4,010,355
61.6 R	4,010,354
151	4,010,356
151.3	4,010,357
151.35	4,010,358
169	4,010,359
193	4,010,360

CLASS 236

1 E	4,009,825
49	4,009,826

CLASS 238

8	4,009,827

CLASS 239

2 R	4,009,828
15	4,009,829
204	4,009,830
315	4,009,831
542	4,009,832

CLASS 240

10 R	4,010,361
147	4,010,362

CLASS 241

14	4,009,833
27	4,009,834
28	4,009,835
73	4,009,836
93	4,009,837
99	4,009,838

CLASS 242

18 DD	4,009,839
35.6 E	4,009,840
58.3	4,009,841
71.9	4,009,842
107	4,009,843
107.3	4,009,844
129.7	4,009,845
201	4,009,846

CLASS 244

3.16	4,009,848
53 R	4,009,849
115	4,009,850
158	4,009,851

CLASS 248

68 R	4,009,852
201	4,009,853
300	4,009,854
352	4,009,855
382	4,009,856

CLASS 249

102	4,009,857
120	4,009,858
122	4,009,859

CLASS 250

201	4,010,363
234	4,010,364
236	4,010,365
282	4,010,366
334	4,010,367
343	4,010,368
356	4,010,369
366	4,010,370
	4,010,371
372	4,010,372
456	4,010,373
472 R	4,010,374
507	4,010,375
578	4,010,376

CLASS 251

44	4,009,860
61.1	4,009,861
63	4,009,862
172	4,009,863
282	4,009,864
318	4,009,865

CLASS 252

8.1	4,010,104
32.7 E	4,010,106
	4,010,107
77	4,010,105
187 R	4,010,112
301.1 W	4,010,108
301.15	4,010,109
314	4,010,110
391	4,010,111
429 B	4,010,113
437	4,010,114
452	Re.29,145
454	4,010,115
455 Z	4,010,116
500	4,010,117
521	4,010,118
	4,010,119
	4,010,120
	4,010,121
	4,010,122

CLASS 254

10.5	4,009,867

CLASS 259

172	4,009,868

CLASS 260

2.5 AJ	4,010,124
2.5 H	4,010,123
8	4,010,125
22 CB	4,010,126
23 R	4,010,127
23.7 M	4,010,128
	4,010,129
28.5 AV	4,010,130
29.3	4,010,163
29.4 R	4,010,132
29.4 UA	4,010,131
29.6 HN	4,010,135
29.6 S	4,010,134
29.6 TA	4,010,133
37 SB	4,010,136
45.75 K	4,010,141
45.75 S	4,010,138
45.8 NT	4,010,137
47 UA	4,010,140
59 EP	4,010,143
59 R	4,010,144
75 R	4,010,145
77.5 AM	4,010,146
79.3 M	4,010,147
112 R	4,010,148
112.5 LH	4,010,149
146 T	4,010,150
160	4,010,151
192	4,010,152
239.3 D	4,010,153
	4,010,154
243 C	4,010,155
	4,010,156
250 AP	4,010,157
253	4,010,158
256.4 F	4,010,159
256.4 H	4,010,160
268 PH	4,010,161
272	4,010,162
293.54	4,010,164
302 R	4,010,173
306.7 C	4,010,175
306.7 R	4,010,174
307 H	4,010,176
308 B	4,010,178
308 D	4,010,179
308 R	4,010,177
314.5	4,010,180
326.14 T	4,010,181
326.5 FM	4,010,182
332.2 R	4,010,184
332.3 R	4,010,165
333	4,010,166
343.2 F	4,010,167
343.2 R	4,010,168
343.6	4,010,169
	4,010,170
346.1 R	4,010,171
390	4,010,172
428.5	4,010,183
433	4,010,185
437 R	4,010,186
448 A	4,010,187
465 C	4,010,188
465 D	4,010,189
	4,010,190
471 C	4,010,191
473 G	4,010,192
	4,010,194
473 R	4,010,193
476 R	4,010,195
484 A	4,010,196
491	4,010,197
497 A	4,010,198
552 R	4,010,199
561 N	4,010,142
570.5 CA	4,010,201
570.5 P	4,010,200
573	4,010,202
586 C	4,010,204
586 P	4,010,205
	4,010,206
601 R	4,010,207
603 HF	4,010,208
606.5 P	4,010,209
609 D	4,010,210
611.5	4,010,211
615 F	4,010,212
617 R	4,010,213
650 R	4,010,214
654 D	4,010,215
680 R	4,010,216
683 D	4,010,217
683.48	4,010,218
835	4,010,219
858	4,010,220
873	4,010,221
	4,010,222
875	4,010,223
878 R	4,010,224
880 B	4,010,226
880 R	4,010,225
940	4,010,227

CLASS 261

23 A	4,010,228

CLASS 264

13	4,010,229
25	4,010,230
35	4,010,231
46.4	4,010,232
63	4,010,233
117	4,010,234
210 F	4,009,511
241	4,010,235

CLASS 266

112	4,009,869
192	4,009,870
193	4,009,871
250	4,009,872

CLASS 267

15 A	4,009,873

CLASS 269

3	4,009,874
38	4,009,875

CLASS 271

99	4,009,876
272	4,009,877
	4,009,878

CLASS 272

31 A	4,009,879

CLASS 273

1 R	4,009,880
115	4,009,881
135 D	4,009,882
149 P	4,009,884
181 C	4,009,883

CLASS 274

10 S	4,009,886
37	4,009,885

CLASS 277

187	4,009,887

CLASS 279

1 C	4,009,888

CLASS 280

423 R	4,009,889
467	4,009,890
651	4,009,891

CLASS 283

6	4,009,892

CLASS 285

110	4,009,893
183	4,009,894
189	4,009,895
305	4,009,896

CLASS 290

1 R	4,010,377
2	4,010,378

CLASS 292

258	4,009,897

CLASS 294

31.2	4,009,898
33	4,009,899

CLASS 296

1 A	4,009,900
28 C	4,009,901
137 B	4,009,902

CLASS 297

14	4,009,903
217	4,009,904
385	4,009,905

CLASS 298

27	4,009,906
	4,009,907

CLASS 299

37	4,009,908
56	4,009,909

CLASS 300

21	4,009,910

CLASS 301

37 SS	4,009,911

CLASS 302

25	4,009,912
58	4,009,913

CLASS 303

92	4,009,914

CLASS 307

9	4,010,379
10 LS	4,010,380
66	4,010,381
106	4,010,382
118	4,010,383
220 R	4,010,384
243	4,010,385
252 UA	4,010,386
253	4,010,387
279	4,010,388
293	4,010,389

CLASS 310

30	4,010,390
87	4,010,392
194	4,010,393
	4,010,394

CLASS 312

71	4,009,915
204	4,009,916
214	4,009,917
255	4,009,918
268	4,009,919

CLASS 313

188	4,010,395
231.3	4,010,396

CLASS 315

57	4,010,397
101	4,010,398
	4,010,399
248	4,010,400
379	4,010,401

CLASS 318

63	4,010,407
266	4,010,408
587	4,010,409

CLASS 320

31	4,010,410

CLASS 323

4	4,010,411
18	4,010,412

CLASS 324

6	4,010,413
16 S	4,010,415
	4,010,419
16 T	4,010,414
54	4,010,416
94	4,010,417
158 T	4,010,418

CLASS 325

4	4,010,420
38 A	4,010,421
141	4,010,422
391	4,010,423

CLASS 330

9	4,010,424
35	4,010,425
53	4,010,426

CLASS 331

94.5 S	4,010,427
117 R	4,010,428

CLASS 333

9	4,010,429
81 A	4,010,430

CLASS 335

18	4,010,431
	4,010,432
129	4,010,433
302	4,010,434

CLASS 336

192	4,010,435
223	4,010,436

CLASS 337

204	4,010,437
232	4,010,438

CLASS 338

125	4,010,439
237	4,010,440

CLASS 339

22 B	4,009,920
99 R	4,009,921
	4,009,922
143 R	4,009,923
223 S	4,009,924
273 R	4,009,925
276 T	4,009,926
	4,009,927

CLASS 340

10	4,010,441
15.5 TS	4,010,442
17 R	4,010,443
63	4,010,444
146.3 H	4,010,446
146.3 WD	4,010,445
167 R	4,010,447
172.5	4,010,448
	4,010,449
	4,010,450
	4,010,451
	4,010,452
173 R	4,010,453
174 TF	4,010,454
224	4,010,455
248 B	4,010,456
253 A	4,010,457
258 A	4,010,459
258 R	4,010,458
311	4,010,460
	4,010,461
347 DA	4,010,462
347 P	4,010,464
347 SY	4,010,463

CLASS 343

5 LS	4,010,465
5 SC	4,010,466
7.4	4,010,467
7.5	4,010,468
18 E	4,010,469
708	4,010,470
754	4,010,471
761	4,010,472
792.5	4,010,473
814	4,010,474
830	4,010,475

CLASS 346

1	4,010,476
75	4,010,477

CLASS 350

2	4,009,928
35	4,009,526
	4,009,929
	4,009,930
96 B	4,009,932

96 C 4,009,931
152 4,009,933
160 LC 4,009,934
4,009,938
160 R 4,009,935
4,009,936
4,009,937
162 SF 4,009,939
163 4,009,940
173 4,009,941
184 4,009,942
207 4,009,943
214 4,009,944
215 4,009,945
266 4,009,946
288 4,009,947
319 4,009,948

CLASS 352

159 4,009,949
166 4,009,950

CLASS 353

7 4,009,951
109 4,009,952

CLASS 354

25 4,010,479
29 4,009,866
43 4,010,480
113 4,010,481
300 4,010,478

CLASS 355

3 R 4,009,953
7 4,009,954
8 4,009,955
13 4,009,956
14 4,009,957
16 4,009,958
71 4,009,959

CLASS 356

1 4,009,960
2 4,009,961
82 4,009,962
85 4,009,963
4,009,964
109 4,009,965
123 4,009,966

CLASS 357

15 4,010,482
17 4,010,483
24 4,010,484
4,010,485
25 4,010,486
31 4,010,487
70 4,010,488
82 4,010,489

CLASS 358

4 4,010,490
127 4,010,317
178 4,010,318
213 4,010,319
233 4,010,321
4,010,322
289 4,010,320

CLASS 360

1 4,010,491
25 4,010,492
96 4,010,493

CLASS 361

18 4,010,403
56 4,010,402
179 4,010,404
433 4,010,405
4,010,406

CLASS 404

129 4,009,967

CLASS 408

12 4,009,968

CLASS 415

217 4,009,969

CLASS 416

134 R 4,009,970

CLASS 417

43 4,009,971
407 4,009,972

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